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THE RECENT SURVEY OF JIQUILISCO BAY AND EL  
TRIUNFO, THE NEW PORT OF SALVADOR.

BY

G. W. LITTLEHALES.

The officers and enlisted men of the United States steamers *Bennington* and *Marion* have just completed a survey of Jiquilisco Bay, Salvador, for the purpose of facilitating the entrance of ships to the Port of El Triunfo, in that country. A harbor where vessels of commerce can lie in shelter and load and unload is of vast importance on the Central American coast, and especially in Salvador, within whose borders the only harbor, hitherto known and used, is La Union. There are ports at La Libertad, Acajutla and Concordia; and one would naturally expect from this title that something pretending to a bay, or deep indentation at least, would have warranted the appellation. But at La Libertad there is only a straight, sandy beach, on which breaks the Pacific Ocean, lying between two slightly projecting ledges of rock about a mile asunder; and this is also the condition at the other places. It is law and interest only that has made them ports, for they derive their existence and importance from their proximity to the respective cities of San Salvador, Sonsonate and San Vicente. Iron piers have been built out beyond the surf line at these places, and in smooth or moderate weather passengers and freight can be landed upon their outer ends. Vessels lying at anchor off these ports roll heavily, and are so much exposed that, during the rainy season, on account of the violent squalls of wind and rain, steamers generally get under way at nightfall and stand out to sea, returning in the morning to resume the discharging or loading of the cargo.

Jiquilisco Bay offers a port where the cargoes of vessels may always be handled in smooth water, and it extends its navigable

branches far into the rich alluvial belt bordering the coast—even to within a league of the Rio Lempa, the principal stream of Salvador, which is reported to be navigable by small steamers for probably one hundred miles, but hopelessly barred from seaward. In a work of 1632, describing Central America, Padre Thomas Gage, an English friar, thus mentioned the Rio Lempa: "This river is privileged in this manner, that if a man commit any heinous crime, or murder, on this side of Guatemala or San Salvador, or on the other side of St. Miguel or Nicaragua, if he can flee to get over the river, he is free as long as he liveth on the other side, and no justice on that side whither he is escaped, can question or trouble him for the murder committed. So likewise for debts; he can not be arrested."

In 1798, the Royal Consulate of Guatemala ordered Don Vicente Rodriguez de Camino to survey this lagoon. He states that it was then named the Bay of San Salvador de Jiquilisco. According to his chart, the anchorage is good and well sheltered, and the coast of the mainland, like that of Tehuantepec, appears to be fronted by a long, narrow island, perhaps formed by the tremendous surf raised by the prevalent winds.

Among the many undeveloped resources of San Salvador, coal may come to have a first value. Mr. E. G. Squier, when he was United States Minister to Salvador, said there was reason to believe that vast beds exist throughout the valley of the Rio Lempa, and in the valleys of some of its principal tributaries, over a region 100 miles long by not far from 20 miles broad. It had long been reported to exist, but he set the question at rest after his visit in 1853, by proper investigations. Coal was found in the valley of the Titiguapa, flowing into the Lempa from the west, also in the valley of the Rio Torola, and large beds are reported to exist near the town of Ilobasco. The coal is all of the variety called brown coal, and is a later formation than what is known as bituminous coal. Similar coal is extensively used in Germany for various mineral purposes.

Early in 1847, at the request of the President of Salvador, who desired to know whether it was possible to open the port of El Triunfo to commerce, the Count of Güeydon, commanding the French brig of war *Génie*, caused a survey of the bar at the entrance to be made, and thus reported in a letter dated February 4, 1847: "After a careful survey of the places, I have become convinced that it is possible and even easy to pass the bar with ships of large tonnage because at low tide there is never less than four metres of water. . . . The banks which are found on this part of the coast are not shifting, as is said, and I am convinced that its (the bar's) position has remained the same for a great number of years."

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The officers of the U. S. S. *Tuscarora*, while engaged in a survey of the west coast of Mexico and Central America, between the years 1880 and 1884, examined the Jiquilisco bar and found two and one-half fathoms of water there. This was followed by a survey finished in September, 1894, under the orders of "El Triunfo Company, Limited"; and later, in November, 1895, by soundings taken by Don Tomas Stich Bonelli, official engineer of the Government of Salvador. All these later soundings, whether expressed in fathoms, metres or varas, agree in assigning a depth of 14 feet at low water. Although it seems reasonable to expect, considering the strong currents sweeping past outside and the vast volume of water flowing in and out with the tide, that the deposit and scouring away of sand may vary the depths on the bar in the course of time, yet an examination of the history of former surveys appears to establish the fact that there has been very little variation of depth of water on it since the earliest surveys.

The Lempa Shoals, as the sand banks at the entrance to Jiquilisco Bay are called, are in the shape of a horseshoe, with the two ends resting on the shore. The oval part extends south. A narrow and nearly straight channel runs down between the arms and ends at the bar at the extreme of the oval. The horseshoe is three miles wide and about the same in length; the western arm, owing to the trend of the coast, being somewhat the longer. Judging from the older charts, it has remained the same, in depth and outline, for a century. Concerning the material of which it is composed, the surveyors report: "The Lempa Shoals are a deposit of very fine gray and black sand. If this sand is dried, a magnetized knife-blade thrust into it comes out looking like a delicate brush." The width of the fourteen-foot channel, leading over the bar between the lines of breakers, is about 300 yards, and its length, from the eighteen-foot line on the outside to the eighteen-foot line on the inside, is 200 yards. Nevertheless, the passage over it is not difficult with a competent pilot. It is believed that no great expense would be involved in deepening the water over it by cutting it out with a drag during the ebb tide.

Although Jiquilisco Bay has so long been recognized as favorable to the development of an extensive region of great fertility and diversity of products, no port was opened upon it until recently. It is reported that many attempts have been made, but that the weight of private interest in neighboring ports turned the scale against it until 1893, when a port was finally opened to commerce. This is the port of El Triunfo, which was started by "La Com-

pañía del Triunfo," a company formed by American and Salvadorean capitalists for the purpose of establishing steam navigation in the new port and developing the commercial and agricultural industries by facilitating the means of exporting the products of that region. On November 7, 1894, the Government of Salvador granted to this Company the exclusive right of steam navigation in the whole bay of Jiquilisco. A town site was marked out by the Government, lots were gratuitously given to settlers, and El Triunfo has now a population of 250 natives, 6 Americans, 6 Greeks, and 1 Englishman. A pier has been built; steam tugs and launches, adequate to the service of the new port, have been provided; the custom-house, post-office and military headquarters have been duly organized; and communication by telegraph established with the Capital.

The principal exports are dyewood and coffee. Nearly all the coffee is shipped to Germany. A little is sent, by the steamers of the Pacific Mail Steamship Company, to the United States.

The imports from the United States consist of flour, timber, and sugar and coffee making machinery; and, from Europe, of wines, liquors, canned goods, barbed-wire fencing, and corrugated-iron roofing.

During the last eight months of 1895, the importations and exportations yielded to the custom-house at El Triunfo the amount of \$38,537.37, there having been exported 12,920 quintals of coffee alone during that time. The following figures will show how rapidly the business in this new port is increasing:

During the single month of April, 1896, the receipts at the custom-house reached \$30,000.00, while for the same time the exportation of coffee amounted to 14,997 quintals. The total exportation of that article for 1896 has been double that of the previous season, and it is estimated that the exportation of the '97 crop through the port of El Triunfo will reach 75,000 quintals.

The opening of this port will stimulate the agricultural and other industries in a certain region of Salvador where development has not been possible heretofore on account of the lack of exportation facilities. Owing to that need a vast district capable of producing sugar-cane, cacao, cotton, coffee, tobacco, fruits and cereals has developed but little beyond local requirements. It is therefore a matter of congratulation that the Navy Department undertook this work, and that it was executed with thoroughness.

The survey was conducted from an accurately measured baseline, nearly two miles long, lying along the ocean beach of San



Sebastian Island. Triangular battens were laid in forked iron rods, lined up with a theodolite and levelled, then measured with a steel tape. Two independent measurements, each corrected for temperature, were made, and the mean value taken as the required length. From this base-line a network of triangulation was carried on throughout the extent of the bay among signals erected at close intervals along the shores. These signals were also used in the determination of the positions of the soundings by sextant angles measured between them. On the accompanying chart the characteristic soundings only are given. They are selected from numerous soundings recorded on the original plotting sheets. The geographical position stated in the chart may be regarded as well determined. The longitude depends upon the transportation of time by chronometers from La Libertad, where a longitude of the first order was determined in 1884 by telegraphic time signals from Panama, in connection with the work of establishing a chain of telegraphic longitudes, by submarine cable connections, that was carried on by the U. S. Hydrographic Office during the decade following 1874. The observation spot at El Triunfo is a rectangular pier about three feet high, built of stone and cement, situated about 50 yards E. S. E. of the Triunfo Company's storehouse, and about the same distance to the southward of the custom-house. Here twelve separate sets of star observations for longitude were made at different times, with the sextant and artificial horizon; and fifteen separate determinations of the latitude were made.

From tidal observations made from a staff gauge secured to a pile under the wharf at the southwest corner of the freight house at El Triunfo, from January 3 to March 31, 1897, the corrected establishment of the port was found to be three hours and twelve minutes and the mean rise of the tide, above the plane of mean low water, six and six-tenths feet. There was a second tide station established in the cove just inside of Point San Juan, the western headland of the entrance. Observations from a staff gauge were also commenced here on January 3, 1897, and carried on more than a month, with a resulting establishment of two hours and thirty-eight minutes, and a mean rise slightly less than that prevailing at El Triunfo. The tide-gaugers, who lived on shore in order to secure uninterrupted series of observations, caught a glimpse of the animal life of this region in the immense flocks of pelicans, white ibises, cranes, herons and curlews which covered the sandy beaches; in the peculiar-looking crabs of various shapes, sizes, and colors that crawled about the beach and up and down the trees;

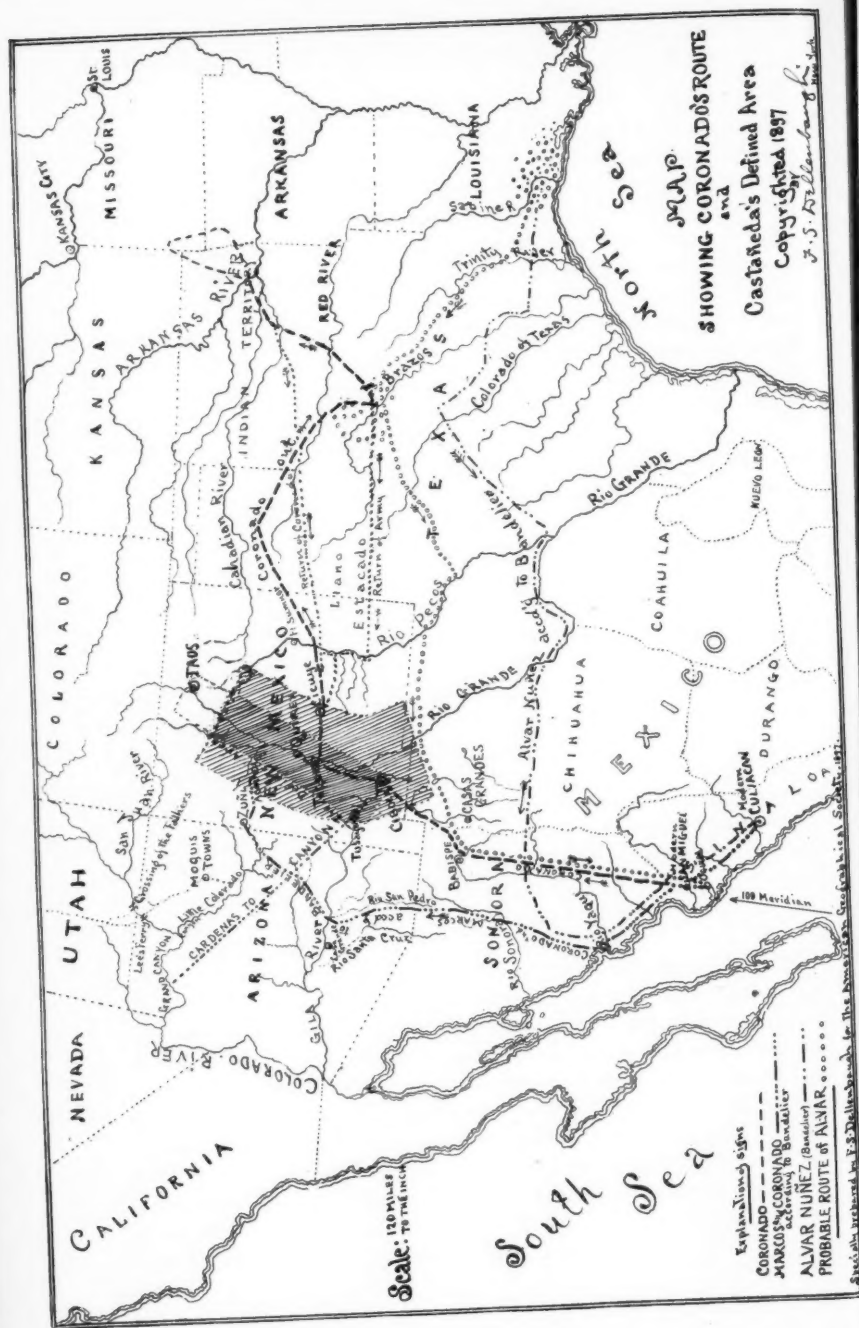
in the porcupine and jaguar which visited the observers' tent one night; in the few alligators which made their headquarters in the waters near by; and in the many iguanas—large lizards—which were killed because their flesh is good to eat for such as can overcome their aversion to the looks of the animal, and because their skins, when cured, are excellent for the manufacture of such articles as card-cases and pocket-books. In Eden's English translation of "Peter Martyr" the edibility of the iguana is referred to in these quaint terms: "These serpentes are lyke unto crocodiles saving in bigness. They call them guanas. Unto that day none of owre menne durste adventure to taste of them, by reason of theyre horrible deformitie and lothsomeness. Yet the Adelantado being entysed by the pleasantness of the King's sister, Anacoana, determined to taste the serpentes. But when he felte the flesh thereof to be so delycate to his tongue, he fel to amayne without al feare. The which thyng his companions perceiving, were not behynde him in greedyness: insomuch that they had now none other talke than of the sweetnesse of these serpentes, which they affirm to be of more pleasant taste than our phesantes or partiches."

The reports both early and late agree in conveying the information that Jiquilisco Bay extends northwestward for a distance of fifteen miles beyond El Triunfo and the limit of the survey as represented upon the accompanying chart, and that its western end lies within a league of the Lempa River.

The physical characteristics of the Barra del Espiritu Santo at the mouth of the Lempa are sufficient to indicate that the river is of such magnitude and character that, even if nothing more were known of it, we might reasonably hope that by artificially reopening the connection, once doubtless naturally open, between it and the bay, steam navigation might be carried on from the ocean to the interior of Salvador.

But fortunately the Lempa has been examined sufficiently to give rise to the statement that small steamers may ply upon it for one hundred miles from its mouth, and there is enough mineral wealth in the valley of the Lempa to warrant Salvador in making a way to transport it to the sea. And when the products of the labor of the people may be loaded in Central Salvador in the morning and by evening be floated to the exporting wharves near the sea, then may the name El Triunfo, originally bestowed to commemorate one of those ephemeral triumphs which were common in these countries in the days of their distraction, be conferred afresh upon the foundation of enduring prosperity.





## THE TRUE ROUTE OF CORONADO'S MARCH.\*

BY

F. S. DELLENBAUGH.

Since the great voyage of Columbus, the Europeans have not rested in their endeavor to explore the world, and leave no part unknown. Our own century has exhibited this spirit as powerfully as any gone before, but each year the field has grown narrower, and before long all terra incognita will have vanished. The widest opportunity belonged to the men of the sixteenth century, for, a limitless blank, the New World lay before them. Columbus unlocked the treasure, and a mighty host rushed in to help themselves to gold and glory. With a magnificent Unknown looming thus suddenly above the horizon like an enchanted vision, small wonder that bold men turned there to retrieve, or gain, a fortune; and Cortes set them all a dazzling example. After his discovery and conquest of the town-building Aztec Indians of Mexico, with their wealth of precious metals, it required no unusual imagination to develop an expectation of greater discoveries, or, at least, a repetition of this one, in the regions yet untrod. Then came the tale of Pizarro's exploits, adding their lustre to the marvellous record. If a New World with its Mexico and Peru, why not further astonishments? So it came about that Mexico, or New Spain as it was called, was chosen as a base of operations by scores of daring knights eager to add glory to their names and lucre to their purses, and some of the most illustrious families of Spain were represented in this fascinating field. Whatever the faults of the Spaniard, cowardice certainly was not one of them, and fear had no part in directing his course on either side of the Atlantic.

But the right of exploration was a royal privilege and not every one was permitted to engage in this fascinating occupation; bravery in itself therefore counted for little. Attention was specially directed about the middle of the sixteenth century toward the northern field and there was rivalry in efforts to gain Crown concessions for exploration in that direction. But Cortes claimed all rights to northward of the Aztec territory indefinitely. Guzman, his bitter foe, Governor of New Galicia, ignored these claims and pushed an unauthorized and brutal conquest as far up as the pres-

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ent State of Sonora, at the same time doing his utmost to annoy and thwart the man who had so superbly broken the path through the Aztec realm.

The misrepresentations, the evidences of cruelty and injustice and misrule, now caused the Emperor to make a radical change in the method of governing the new country; instead of captains-general and presidents, and audiencias, he created the imperial office of Viceroy, and then induced to occupy the post a man of distinguished family and high integrity—Antonio de Mendoza. This officer proceeded to oppose himself to both Cortes and Guzman, though Cortes certainly merited more consideration than he had ever yet received from the Crown officers; or from the Crown itself.

Stories of Amazons and gold in the north had lured Guzman on. Tales related to him while he was President of New Spain, by an Indian slave of his, had added to the allurements not a little. This man told how he, as a child, had travelled with his father, a trader in plumes, far into the interior where there were seven large towns as great as Mexico, and abundance of gold and silver. This appeared to confirm rumors of rich populations in the north that had grown in importance with frequent repetition. But Guzman's operations discovered nothing of special wonder, proving that so far as the region he had explored was concerned little ready-made wealth could be expected. A special agent named Torre was sent over from Spain to arrest Guzman and supplant him as Governor of the province. This was in 1536.

Torre arrested Guzman while the latter was on a visit to the City of Mexico and he was in prison for nearly two years, when he was allowed to depart for Spain. There he lived neglected for some six years and died. Torre, a wise and humane man, had meanwhile established himself as Governor in Guzman's stead of the vast territory north of Mexico called New Galicia.

Near the end of 1538 Governor Torre was killed by a fall from his horse while in pursuit of Indians, and the office was open for a third occupant. The Viceroy appointed a friend of his, Francisco Vasquez de Coronado, who at that time held a minor office under him, Governor in Torre's place, the appointment receiving Royal confirmation bearing date, April 18th, 1539.

Coronado was a native of Salamanca, and it is not known how long he had been in New Spain, nor is anything of his previous life known. But in New Spain, besides being a favorite with Mendoza, and an official under him, Coronado had the distinction, and the



prestige of being the son-in-law of Estrada, the Royal treasurer; a relationship that must have been of immense advantage to him in many ways. Estrada and Mendoza were in complete harmony. Cortes charged that Mendoza had taken the town of Jalapa from the Crown revenues and granted it to the wife of Estrada on condition that it should go to Coronado as the marriage dot of the daughter Beatrice. However this may have been, it is certain that Mendoza had a warm regard for the new Governor of New Galicia, and that the Governor was more than well off in worldly goods. Indeed he was a wealthy man. His new office gave him also an annual salary of 1,000 ducats, with 500 more to be taken from the provincial revenues. It should be added in justice to Mendoza, that the town which the wife of Estrada received was compensation for another of which she had been wrongfully deprived by the Audiencia.

Coronado's age is nowhere mentioned, but as he had only recently been married and had not before been heard of, it is probable that he was not over thirty. His public career was brief and brilliant. Less than ten years cover his known life.

When Coronado departed for his new post, at the end of 1538,\* there went with him a man, also destined to link his name forever to the country, still lying a silent mystery in the far north. The companion of Coronado on this journey to New Galicia, was a Franciscan monk, called Marcos of Niza. He was an Italian, hailing from Nice (Spanish, Niza), hence the name, the only one by which he is known. Marcos was to make a reconnoitring expedition into that far-away incognito at the north, under the Viceroy's orders. With him, as companions, were another monk and a negro, named Estéban; a negro with a history. This Estéban had recently passed through a remarkable experience. Together with three Spaniards, all four being survivors of the wrecked Narvaez expedition, lost near the mouth of the Mississippi, he had wandered about in the interior for eight years, till the party at last succeeded in finding the west coast of Mexico and their countrymen. They had appeared as from the dead, in 1536, and Alvar Nuñez, the head of the party, told the tale of their fearful exile. Alvar Nuñez seems not to have exaggerated his story, and his description of the country and the Indians corresponds with what is known to-day. He is supposed not to have seen any pueblo towns, because he does not exclaim over their grandeur as the monk

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\* He went before the commission was confirmed.

Marcos did later, and because his route has been traced well south through Texas, and through Mexico below the line of the United States, and below the supposed southern limit in 1540 of the house-dwelling Indians. But this limit of the pueblos was possibly much further south in 1540 than has generally been supposed, further than Bandelier and others have allowed. Again Alvar and his companions may easily have come further north than Bandelier allows. Alvar certainly mentions houses that are suspiciously like the pueblo structures,\* and it must be borne in mind that he was so familiar with the Indian that he would not have been carried away by enthusiasm when he happened to meet with some of them dwelling in more permanent houses. Though he seems to have told a straight story, it is probable that Estéban did not, and it would seem that in connection with Marcos, Estéban laid the foundation for the huge misrepresentations that led to this preliminary expedition, and also to the following one under Coronado.

Núñez had returned to Spain, therefore Marcos and Estéban had a clear field. The instigation of the Soto expedition, to the Mississippi region, is, by some writers, attributed to the exaggerations of Alvar Núñez, but in view of the sober narrative from his hand that has come down to us, this charge appears unjust. Estéban and the scheming monk must be regarded as the main source of the tales of marvellous cities and treasure to northward, in the region which the exiles had skirted. In view of the monk's subsequent conduct and statements, this accusation cannot be considered unmerited. Much that he related, to be sure, was what he heard, or claimed to have heard, but as he could not have clearly understood the language of the natives, it is plain that he gave the account his own colouring.

It was about two years after the return of the Alvar Núñez party to civilization, that Marcos started (1539) with Estéban on the now famous reconnaissance. His instructions were to visit and report on the wonderful towns that were said to lie in the far, mysterious north. If successful in his journey and the towns were found to be as important as rumor indicated, a large expedition was to follow up the discovery, in which happy event the ambitious friar would certainly be brought into special prominence, with fine chances for ecclesiastical preferment; the stepping-stone, it might be, to still higher seats. The route he is generally credited with following is marked on the accompanying map. While with Alvar

\* *Relacion of Alvar Núñez*, translated into French by Ternaux-Compans and into English by Buckingham Smith.

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Nuñez on the memorable journey, the negro Estéban had always informed himself about the route and all matters pertaining to the country and the inhabitants,\* so it is certain that he would be entirely able to follow back on their incoming trail as far as the point where Marcos expected to turn more northward in the direction of the supposed great cities. The uncertainty of the route followed by the party of exiles precludes the present determination by that means of that followed by Marcos and his negro guide, but I feel sure that it has, for all parties, usually been drawn too far to the west.

At a certain place on the journey they began to receive accounts of the Seven Cities of Cibola, far to the northward, and Estéban was sent ahead to investigate. He returned frequent word of the increasing wonders of which he was on the threshold. All now seemed on the side of the bold friar, yet disaster was in store for him. Estéban was killed at the very first of the Cibola towns. The monk therefore dared go no nearer than a hilltop, from which he was able to obtain, so he claimed, a view of the town, which he afterward described in glowing language. Hastily retreating, Marcos arrived again safely in New Galicia, and told his story to Governor Coronado with such good effect that the Governor started with him for the capital where an interview, or rather a conference, was had with the Viceroy. Many disappointments that followed would have been avoided, probably, if Marcos had described things as they were, without the color of his imagination, but he chose the other course. Some degree of secrecy was maintained regarding this tale, but it transpired soon that he had spoken of great marvels and wealth in the far country he had visited. Visions of a second Aztec treasure, then immediately occupied all minds. Cortes, however, ridiculed the priest's statements and declared the holy explorer had seen nothing; but had made up the story from what he had learned of Cortes's own northern exploits. Castañeda,† writing twenty years later, states that Marcos arrived no nearer to Cibola than sixty leagues, which would be 20 leagues north of the place called Chichilticale. The point derives additional interest, because it lies between Alvar Nuñez, Marcos, and Coronado, as to which was the first European to enter the present bounds of New

\* "Le nègre était toujours chargé de s'entendre avec eux; c'était lui qui prenait des informations sur la route que nous voulions suivre, sur les peuplades, et sur tout ce que nous voulions savoir."—TERNAUX-COMPANS, p. 246.

† Pedro de Castañeda de Najera, a member of Coronado's expedition in a capacity not stated.

Mexico. Through his eagerness to achieve grand results and thus assure the organization of the great expedition which would bring him preferment and added distinction, the monk doubtless somewhat deceived himself, not only in the importance of the towns, but perhaps also in the distance travelled. At any rate the account he now rendered to the Viceroy and Coronado, was sufficient to cause them to organize the grand party of exploration with considerable alacrity. Marcos, through the Viceroy's influence, was now raised to Provincial of the Order, so that rewards for his labors were beginning. While Mendoza promoted the enterprise, he seems not to have had any great enthusiasm over it. The explorations of Cortes and of Guzman in the north country had probably indicated to his shrewd mind just about what might be expected in that quarter, yet he was willing to further the exploration in the hope that something rich might be found as the priest said, and for the purpose of clearing away as far as possible the northern mystery.

In one of Coronado's letters to the Viceroy this attitude is indicated. He remarks, when the army was disappointed, that the things "whereof the father had made so great bragges should be found so contrary, . . . . I sought to encourage them the best I could, telling them that your lordship always was of opinion that this voyage was a thing cast away."\* There were men of discretion and judgment in those days as well as now, and Mendoza was undoubtedly one of them. His whole career certainly is against the usual assumption that he lost his head over the friar's report. Indeed, the impression conveyed by many writers that all the Spaniards of the sixteenth century were mere wealth-hunters, dazzled to the verge of insanity by schemes of conquest, is erroneous. Still, there were many fortune-hunters in New Spain, and possibilities were fully recognized by all, so when the expedition to the north was proposed, men rushed to the venture with expectant celerity. Some of the finest cavaliers of the country joined the ranks, till Coronado, who was chosen by the Viceroy as general, speedily found himself at the head of an army of 300 Spaniards, many of whom were noblemen of so high degree, that their rank in the expedition was something of an embarrassment to not only Coronado, but to the Viceroy, in arranging the order of command.

Both these men, however, possessed tact and administrative ability, and the matter was successfully settled by making the prin-

\* From Hakluyt's translation of Coronado's letter. The strange spelling is not retained. Winship gives this passage, "Your lordship had always thought that this part of the trip would be a waste of effort."—WINSHIP, p. 553.

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cipal cavaliers captains, each with an independent company, while the 800 Indians and all the other Spaniards were directly subject to Coronado's orders. This arrangement, while not being the most desirable one, seems to have been the best that could be accomplished. Undoubtedly it was the cause of some of Coronado's lack of control in several instances, where officers executed orders in a brutal way that never could have been intended by the general, who was a man of mild manners. His orders were executed, but not always, it would seem, exactly to his taste.

When the army assembled at Compostela, the place where the Government of New Galicia was then installed, Mendoza caused every man to swear, on a holy missal, obedience to the general. In no other way could the high-born cavaliers, bound by no military law, be held to submit themselves to the orders of one whom they considered in no way entitled to command them, except by the preference of the Viceroy. Coronado met the difficulties of the situation at all times, it seems to me, with rare skill and patience. He carried the command through without a rupture, or even a quarrel, under the most trying conditions; and notwithstanding the bitter disappointments, men and officers respected and even loved him to the end. The most that Castañeda can do is to charge him with a desire to return to his wife and children at the end of the two years, instead of pushing further into the wilderness.

Some complaint having been made that this expedition was depriving the colonies of needed men, an investigation was held by which it appeared that the army was largely composed of recent arrivals from the Old World, well-born, but poor. Only two citizens of Mexico, and two of Guadalajara, were to be discovered in the ranks, while Compostela furnished none. But all the men were eager to go with the great undertaking, and were not likely to allow an inconvenient residence in any town to interfere if they could prevent, nor is it probable that the investigation was made searching enough to interfere with Coronado's plans. Castañeda speaks with great enthusiasm of the make-up of the army, saying that "they had on this expedition the most brilliant company ever collected in the Indies to go in search of new lands."\*

\* Winship, p. 477. "The Coronado Expedition," by George Parker Winship, in the 14th Annual Report of the Bureau of Ethnology. By the courtesy of Mr. Winship, and of Mr. Hodge of the Bureau of Ethnology, I was furnished with a separate copy of this paper before the report appeared,—and some three months after my paper was first read before this society. I have revised my first writing since, because Mr. Winship's translation in the main is more accurate than Ternaux's, and I had then a copy of the Castañeda text at hand for constant comparison.

started about the last of February, 1540, according to a letter written by Mendoza to the King, but Castañeda places the start a little later in the year, and his year-dates, all the way through, are a whole twelvemonth in advance. This may have been an error in the copying of the original manuscript, that which is now owned by the Lenox Library, and which bears date 1596, being the copy; the original, if in existence, is unknown. In all other respects the copy appears to be an accurate transcript of a remarkably careful statement of the incidents, and route of the great march from Mexico to the Mississippi Valley. The other chief sources are Coronado's letters, the narrative of one of the captains, Juan Jaramillo, and several documents that were written later than these by various hands.\* In the list of officers which Castañeda gives, neither he nor Jaramillo are mentioned. Both were men of education and intelligent observation. Castañeda wrote his narrative twenty years after the return while he was living in Culiacan, and Jaramillo also wrote after the return, and with less fullness. He was a soldier of wide travel and experience, having visited most of the countries of Europe, in the service of the Spanish monarch.

With great splendor and high hopes the army pushed out toward Culiacan, the last outpost of European life, and the Viceroy, to give them Godspeed, rode himself for two whole days at the head. One of the most interesting and picturesque sights ever beheld on this continent, was this long and motley cavalcade. In glittering armor and shining helmets rode the dashing cavaliers, their warrior costume and martial bearing enhanced by contrast with the sombre robes of the Franciscan monks, and these in turn made conspicuous by the surrounding throng of soldiery in 16th century costume, arquebusiers, cross-bowmen and gunners, hundreds of half-naked Indians, and droves of cattle and sheep, all moving under the superb Mexican sky, across a landscape of rich and varied color.

But the army was overloaded with baggage, many men knew little about packing a horse, and difficulties soon began to appear. Much baggage was thrown away, and doubtless many an officer cast to the earth his pretty armor to lighten his burden.

San Miguel de Culiacan, their immediate destination, was the same place from which the bold Marcos had departed the year before, and he evidently now meant to lead them over the identical route which he and the negro had followed. The exact location of this place is of the first importance. It has generally been iden-

\* See "Critical Essay on the Sources of Information," by Henry W. Haynes, p. 502, Vol. II., *Narrative and Critical History of America*.

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tified with the modern town of Culiacan. I believe this is an error, for the reason that the route which Castañeda says they followed from this point, cannot be laid down from modern Culiacan. We reach the high mountains too soon and are taken too far east. The course followed, Castañeda states, from Culiacan, "kept the north on the left hand."\* In other words, from this place, called Culiacan in 1540, to the edge of the "wilderness," the route was slightly *northeast*. Now, we have either got to follow Castañeda's directions in tracing the route, or we must throw him out and draw it where we think it ought to go to fit our notions of the line of march. If we throw him out, we may accept the course heretofore marked, following the coast *northwestward* for a very great distance before turning north, and then keeping a slightly *northwest* trend far up into Arizona, but I prefer to accept Castañeda's statement, and follow it exactly. Otherwise we are likely to go astray on the start, and it is probable that it is right here that what seems to me the heretofore erroneous charting of Coronado's trail began. Having made a wrong start, the error ran through the whole reckoning. I assume, therefore, that the Culiacan of to-day was not the San Miguel de Culiacan of 1540, but that this place was further up the coast, not far from where the 109th meridian intersects the sea, or in the neighborhood of a town now called San Miguel.† From here it is possible to lay out a route that fits well the requirements. It must be remembered that this San Miguel de Culiacan was the merest outpost at that time, and that in the following years names of towns and rivers underwent many and confusing changes.‡ If, then, we can chart a route that accords with the directions, by coming up the coast from the modern Culiacan, it is pretty good evidence that we are nearer the truth than at the other place. Furthermore, it will be seen that by a back check from my location of Cibola and the "edge of the wilderness," the site of the starting point should be placed about as I have stated. That is, if the route from Culiacan was east of north, the route from Cibola and the

\* "Depuis Culiacan on avait toujours marché en laissant le nord un peu vers la gauche." TERNAUX, p. 163. "From Culiacan to the edge of the wilderness the route had kept the north on the left hand." WINSHIP, p. 517. The *Relacion del Suceso*, p. 573, WINSHIP, gives the route from Culiacan to Cibola as *two* directions, *north* to a certain point, and then *N.E.*

† On Rand, McNally & Co.'s map, of 1892.

‡ The Villa de San Miguel was founded by Guzman in 1530, on a site unidentified, and was moved the next year, and finally at an unknown date, according to H. H. Bancroft, moved to or near the present site of Culiacan.—*Northern Mex. States*, p. 38.

"edge of the wilderness" should be west of south, and so, according to my reckoning, it does fall.

Starting, then, say from about the present town of San Miguel, and marking a course slightly east of north, as Castañeda directs, the trail falls between the 109th meridian and the Sierra Madre, an entirely feasible road.

From Culiacan Coronado went ahead with a picked band of some fifty men, leaving the army to follow more leisurely. Castañeda remained with the main body. This advance party had a hard time of it. Though they "carried none other needful apparel that was above a pound weight, we were driven to our shifts, and no marvayle because the way is rough and long, and with the carriage of our harquebuses down the mountains and hills and in the passages of rivers, the greater part of our corn was spoiled."\*

Meanwhile, the sea expedition under Alarcon, which had been sent up the coast to coöperate with the land party, was led further and further away by the configuration of the land, and became useless so far as any help to Coronado was concerned. It achieved important results, however, of its own, in the discovery of the Rio del Tizon, the Colorado of the West of to-day.

Coronado's journey led him through "exceeding rough mountains," and he was "much grieved" because Marcos had said "that the way was plain and good and that there was but one small hill of half a league in length." "And yet, in truth there are mountains, which although the way were well mended, could not be passed without great danger of breaking the horses necks."†

They were following up the longitudinal valleys lying between the 109th meridian and the Sierra. They crossed a number of streams, among them the eastern branch of the Yaqui, which was their Yaquemi, and also a little creek they named *Señora*, a branch of the Yaqui, since perverted into *Sonora* and incorrectly identified with the present Sonora River. Four days from here they reached a stream called Nexpa, and heretofore identified with the Rio Santa Cruz or the Rio San Pedro, flowing into Arizona. The Nexpa flowed in a northerly direction, and as the route heretofore has been traced up the present Sonora River it was necessary to go further north for a stream flowing in the right direction. But the *upper* part of the *west* branch of the present *Yaqui* flows northerly and northwesterly before making the great bend to the south, and is right in the correct line of the march. It was to this stream, therefore, and not to the Santa Cruz, that Coronado went from the Señora. The

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\* Hakluyt.

† Hakluyt.

Yaqui to-day is little known and has a new name at each important bend. This method of distributing names along its banks seems to have begun in Coronado's day. By taking this branch as the Nexpa we are able to hold to Castañeda's statement of direction, and also to follow pretty accurately the course described by Jaramillo. The latter travelled much more rapidly than Castañeda, and was much more fatigued, hence some rivers he mentions did not appear of the same importance to the slower moving column. It was a flood time when Jaramillo passed through the northern part of the route before reaching Cibola, so small streams appeared more important than they really were. Following the Nexpa down for two days, Coronado turned to the right to a range of mountains called Chichilticale, and spoken of by Castañeda in several places as the Cordillera. This was probably the main Sierra Madre. Coronado was now in the neighborhood of the modern town of Babispe, where to-day a trail goes over the range by the Pass of Carretas, from piney slopes to barren wastes. Somewhere in this region Coronado passed over the barrier.\* Here was the end and beginning of the mountains so distinctly noted by Castañeda. "At Chichilticale," he says, "the country ceases to be covered with spiny trees and changes its aspect."† Mr. Bandelier says, "From the heights of Cuesta Grande, where the last ascent is made, we gaze as it were upon another world. . . . On the crest the view changes, and in place of deep mountain gorges, a broad level stretches to the east, bleak, bare and solemn."‡ Castañeda says, "It is at Chichilticale that the mountains end and the desert begins." They had to cross these mountains to get to the level country. Here was where the "wilderness" began.§ From here on the country was unoccupied, till they reached Cibola.

This was the end of what I term the Mexican Mountain Division of the journey. The exploration from my standpoint resolves itself into three general divisions. First, the Mexican Mountain Division; second, the Rio Grande Valley Division; and third, the Buffalo Plains Division.

This first division was separated from the second by a decided change in the aspect and vegetation, as noted by Castañeda

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\* About lat.  $30^{\circ}30'$ , long.  $108^{\circ}35'$ .

† Ternaux, p. 160; Winship, p. 516. "Spiny" or "spikey" could not have referred to cacti, for these grew (Win., p. 515) in the Cibola wilderness. It may have meant the palm or the long-leaved pine.

‡ Part II Report.

§ Winship, pp. 480 and 482.

and confirmed by the actual topography of the region. Jaramillo says, "Leaving the stream (the Nexpa) we went to the right to the foot of the Cordillera." He must have referred here to the main Sierra which to-day, from Guadalajara to the north boundary of Mexico, is crossed by no wagon road.

Meanwhile provisions were scarce with the invaders. The maize in the fields was not yet ripe, and the natives through the Mexican Mountain Division had few stores. The soldiers, therefore, were lean and hungry. Heavily, also, disappointment rested on them, for Melchior Diaz, who had been sent ahead with a reconnoitring party, had met them some distance back with a doleful report. The outlook was black and the friar's glorious tale began to look the gilded bubble that it was. But he made the light to shine again by fixing their minds upon the wonderful Cibola still before them which Diaz had not reached. "We all conceived great grief," says Coronado, "and were not a little confounded when we found everything contrary to the information which he (Marcos) had given to your lordship."\* And well they might, for on reaching the Chichilticalli† or Red House so highly extolled, it was found to be but a single large ruin and no town at all. It is this that makes it seem as if the monk had either gone astray or had never even reached before as far as this Red House. It is quite possible that, not knowing the country, and being without Estéban's guidance, the monk may have lost his way, and so have guided Coronado by a different trail than the one he had before followed.

Chichilticalli has usually been identified with the ruins near Florence, Arizona, known as *Casa Grande*, the accepted route of the army lying that way, and Mr. Bandelier seems to have been the only one before this to even suggest that the ruin called *Casas Grandes* in Chihuahua was equally accessible to the general, and therefore might have been Chichilticale. The clue was followed no further than to state that Coronado might possibly have passed due north from Casas Grandes into New Mexico. As this would have necessitated a northwest course then to arrive at Zuñi, for Cibola, the idea was dropped, and Bandelier finally placed Chichilticale in the neighborhood of Camp Grant in Arizona. The true site is probably not many miles from the Chihuahua ruin. I am inclined to think it was a ruin of which we have as yet had no description.

Coronado, according to my drawing of the route, was now on the east side of the Sierra Madre, and had entered what I term the

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\* Hakluyt.

† Also spelled Chichilticale.

second or Rio Grande division of his journey, a division extending as far as the most northerly place reached on the river, the pueblo of Valladolid. There is a great change on crossing the Sierra Madre. "One finds the landscape so different from what it was on the western flanks of the Sierra Madre" says Bandelier of this locality. "There are no trees, only grass and cactuses covering the dreary plain." Such was the region that the weak and staggering followers of Coronado, and the banner of Hope, were now entered upon, and which Castañeda describes as the desert or unoccupied land. The contrast with the forests and streams of the mountains just behind was truly striking.

By the time that Coronado was nearing the Cibola province his men were in a desperate condition for want of food. Anxiously they peered ahead through the waste stretches for the promised cities where food and wealth were said to wait for all of them. The direction followed was now somewhat more northeasterly than before crossing the Cordillera, sometimes through barren mountains, sometimes through an oasis of pine forest, the country as a whole gradually rising as they proceeded northward. Passing northward to-day from the State of Chihuahua the traveller finds this rising feature a marked one. From the last camp before reaching Cibola, they departed, says Coronado, "in so great want of victuals that I thought that if we should stay one day longer without food we should all perish for hunger, especially the Indians, for among us all we had not two bushels of corn."\*

They had now crossed the boundary of New Mexico, and arrived presently at a red and turbulent stream which Jaramillo (who gives more attention to the streams crossed than any one else) calls the Bermejo, or Vermilion. This heretofore has been identified with the Colorado Chiquito, or Little Colorado, and the Rio Zuñi, a branch. I think it was the Rio Mimbres, in the vicinity of the Florida Mountains. As it was red and turbulent, it is plain the stream was in flood. This indicates a rainy time, also indicated by the fact that at one of the previous streams, which Jaramillo says was rising, they were obliged to cross on rafts. The point I would call attention to here is that as the men were fagged and weary, and the streams at flood, more importance was given by Jaramillo to some of these streams than they would have received under normal circumstances. Castañeda, indeed, who came along leisurely with the main army when the rains apparently had ceased and the streams had either dried up entirely or had returned to their ordinary depth,

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\* Hakluyt.

hardly notices any stream in this locality. It is a region also where the streams sink in lakes, or by gradual disappearance. It is an inland basin.

Jaramillo makes a curious statement regarding these rivers. "All the waterways we found as far as this one at Cibola—and I do not know but what for a day or two beyond—the rivers and streams run into the South Sea, and those from here on into the North Sea."\* Just what he means by this is not entirely clear to me, but he is believed to mean that all the rivers as far as Cibola ran into the Pacific and beyond that into the Gulf of Mexico, these places corresponding to the North and South seas of the 16th century. If I am right in my tracing of the route he did not mean exactly that, but either got mixed on account of the sinking streams or intended to convey information about this inland basin that has in some way become unintelligible.

The Mimbres sinks now in the ground; at that time it may have gone on and disappeared in a lagoon. It now flows, except in unusual seasons, no further than the town of Deming. But there is a probability that this region had, in former times, a somewhat greater rainfall than it has at present. The gradual drying up of the lakes about the City of Mexico is a fact, and it is at least possible that this diminution in rainfall has been felt further up the Sierra, even as high as New Mexico.

Two days, or eight leagues, beyond the Bermejo, Coronado arrived, about the 7th or 10th of July, 1540, at the first of the Cibola towns; the first installment of the reward for the long and dangerous journey. When the men at last beheld the insignificant village their wrath was justly great, and their maledictions fell heavily upon the man who had so persistently led them on with the gilded tale. The weary soldiers had no recompense but these curses, and like gamblers in a losing game they went forward in the hope that the next deal might bring better luck. If Marcos had the faintest spark of soul in his make-up, his remorse at beholding the dismal results of his misrepresentation must have well-nigh killed him. Referring to him in a letter to the Viceroy, Coronado says, "and to be brief, I can assure your Honor he said the truth in nothing that he reported, but all was quite contrary, saving only the names of the cities, and great houses of stone, for although they be not wrought with turqueses nor with lime, nor bricks, yet are they very excellent good houses of three, or four, or five lofts

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\* Winship, 587. Ternaux, p. 370.



high."\* Coronado was not vindictive; to spare the monk he sent him back to Mexico at the first opportunity.

Cibola is now famous, because it was the first group of Pueblo villages known to have been met with by Europeans. It has been located at Zuñi, at the Moquis towns and at Chaco Ruins, by various authors and students, but of late the site of Zuñi has been accepted as the true one by the majority of archæologists. My location for this group of towns is far removed from Zuñi, or, indeed, any site that has ever before been mentioned. I place it in the vicinity of the Florida Mountains in southern New Mexico.

This was probably the first group of permanent dwellings discovered within our boundaries. It is the key to Coronado's subsequent movements. The importance of giving it the right location will be apparent. Without an unimpeachable location for this first group of towns, early American history is defective.

When Coronado finally stood before the walls with his tottering army, he was naturally met by opposition. The Indians, unaware that they had been expected to give up all they owned to these dashing cavaliers and make them rich, seemed to hold the idea that they had a right to control their own property. But they had never seen white men before and did not understand justice. Some of the scouts of the tribe had met the army leagues back, and had brought an account of the approaching strangers to the governors and the war chief. These dignitaries doubtless had spent the whole night in discussing the proper thing to do, and when the dawn came and they climbed out of the kiba, they were determined to beat the unwelcome visitors back from their gates, just as their Aztec brethren had also resolved to do some twenty years before, and just as their Pueblo brethren and their descendants vainly continued to do through a century and a half after Coronado and his greedy army had passed away. Unlike the Aztecs, the Pueblos had arrived at no system of confederation, and while their resistance was often protracted and stubborn, it was not concerted, excepting for a time in the rebellion of 1680, and resulted invariably in defeat.

Coronado's men were anxious to attack the town on sight, and no wonder, as they expected to get something to eat within; and if there is anything a man will fight harder for than gold it is food when he is starving.

The General held them back, but finally when the priests joined in the request for permission to attack he gave the word, and for

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\* Hakluyt.

the first time the sky of New Mexico looked down upon the Red and the White in battle, a sight which presently was to become anything but novel. The assault was well planned, but suddenly "the cross-bowmen broke their bowstrings, and the arquebusiers at the same moment failed to act, because they were so weak and feeble that scarcely they could stand on their feet." So the Indians for a time had it all their own way, and after the method of Pueblo warfare, they showered large stones from above, doing much damage. Twice was Coronado knocked to the ground. His shining armor and helmet made him a target, for the Indians at once saw that he was the leader of the foe. Cárdenas sprang to his side and warded off the blows till the General could regain his feet. "I was more wounded than the rest," he writes, "not that I did more than they, or put myself forwarder than the rest, for all these gentlemen and soldiers carried themselves as manfully as was looked for at their hands."\*

At length the natives were forced to yield, and Coronado occupied the town, to which he gave the name of Granada, because it suggested this city to him, and also in "remembrance of the Viceroy."

The Cibolans seem to have had no metals of any kind. They had turquoises and green stones referred to by Coronado as emeralds, which were probably nothing more than the beautiful peridots still found in that region. Though the town contained no dazzling riches, it did contain what, at the moment, was more important—a large supply of Indian corn. The famishing Spaniards found then some recompense for disappointment in the comforts of satisfied hunger. The Cibolans, too, appear to have had ideas about cookery, for Coronado says, "They eat the best cakes that ever I saw."

There has been a great deal of speculation as to the origin of the name Cibola, and many theories have been advanced. We have only to accept Coronado's plain statement to make the point clear. He says, "The Seven Cities are seven little villages, all having the kind of houses I have described. They are all within a radius of 5 leagues. They are all called the kingdom of Cevola, and each has its own name, and no single one is called Cevola, but all together are called Cevola."† It seems to me perfectly clear from this that the towns Coronado first came to were called Cevola, Cibola or Tzibola *by the inhabitants before* the Spaniards came. Of course, if we locate Cibola at the Zuñi site, then we must skirmish about to explain the name, but if we put the place where it seems to belong,

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\* Hakluyt.

† Winship, p. 558.

in the vicinity of the Florida Mountains, Coronado's statement may be accepted at its full value. The *Relacion del Suceso* says, referring to these towns, "the whole of this settled region is called Cibola."

"It is a little unattractive village, looking as if it had been crumpled all up together" (Winship, p. 483), says Castañeda, referring to the first village. The people fled and the army made themselves at home. Here Coronado made his headquarters and persuaded the natives to return. While waiting for the main army to arrive he gave his attention to reconnoitring the surrounding country. He visited all the Cibola towns and made himself familiar with the region. From here he saw the Rio Grande, and mentions the fact. He had information of a town called Acucu, and "beyond this town," he writes, "they say there are other small towns which are near to a river, *which I have seen*, and have had report of by the relation of the Indians." (Hakluyt; Winship, p. 560.) Now, even if we identify Acucu with modern Acoma, as is generally done, the river beyond it would still be the Rio Grande, therefore the river he had seen was the Rio Grande, and as it would be quite impossible to have seen this river from any point around Zúñi, and would be easy from an eminence near the Florida Mountains, we may conclude that he saw the Rio Grande from Cibola in the vicinity of these mountains during some of his rides.

As the approximate position I assign to Cibola agrees with this statement concerning a view of the river, it may be assumed as a working basis that the site was not far from the Florida Mountains, within 8 leagues of the Rio Mimbres. Coronado remained at Cibola from July to November, and therefore became pretty well acquainted with the locality.

News was brought of another province, called Tuçano, or Tusayan, lying about 20 leagues northwest of Cibola, and Don Pedro de Tobar was sent out there to investigate. He found the province similar to Cibola, but larger and better built. There he was told of a large river, still further off, in that direction, which he reported to the General on his return. Coronado was determined to explore the country, gold or no gold. He says: "I have determined to send throughout all the surrounding regions, in order to find out whether there is anything, and to suffer every extremity before I give up this enterprise." (Winship, p. 562.) "If all the riches and the treasures of the world were here, I could have done no more in the service of his majestie, and of your lordship." (Hakluyt; also see p. 560, Winship.) Coronado laid his plans

accordingly, and sent Don Garcia Lopez de Cárdenas, one of his boldest officers, to explore in the direction of the great western river reported by Tobar. Cárdenas accordingly proceeded to the Tusayan province, where he was well received, and where he obtained guides. Continuing in the northwesterly direction for twenty days from Tusayan, he reached the river. The banks were so high and steep that he appeared to be three or four leagues above the water. (Ternaux, p. 62; Winship, p. 489.) Those who have peered into the sublime depths of the Grand Cañon of the Great Colorado will at once recognize the sensation thus expressed by Cárdenas. One certainly feels leagues in the air as he stands on the brink of this mighty chasm (6,000 feet deep), which, for a distance of some 300 miles, can be crossed by even the sturdiest and most experienced mountaineers in but few places. There can be no question as to the identity of the cañon arrived at by Cárdenas, but there is a question as to the point he reached and the location of the Tusayan he started from.

Heretofore, Cibola having been placed at Zuñi, it was obligatory to put Tusayan at the modern Moquis towns, these being about the right direction, though *more than twice the proper distance away*. Tusayan was about 50 miles (20 leagues and 2.6 miles to the league) northwest of Cibola. The Moquis towns are more than a *hundred miles* northwest of Zuñi. For years I have not felt satisfied with the accepted statements regarding the sites of Cibola and Tusayan, and the more I looked into the evidence the more it seemed to me that a great mistake had been made. Captain Bourke placed Cibola at the Moquis towns, and Lewis Morgan put it at the Chaco Ruins, but these locations were more unsatisfactory than the Zuñi site, and so far as I know they have been given up by all the students of to-day. I finally felt that the Moquis towns could not be Tusayan, and that Zuñi could not be Cibola, and that a proper adjustment of the data without preconceived ideas would probably disclose an entirely new situation of all the 16th century towns. One of my first doubts arose over the length of time Cárdenas occupied in going from Tusayan to the brink of the cañon. He was twenty days, and for a man as energetic and daring as Cárdenas, travelling light, this was not a reasonable time. The usual day's journey was six or seven leagues, or  $15\frac{1}{2}$  to 18 miles. This would give as the distance covered by Cárdenas between the Tusayan villages and the cañon about 350 miles. From the Moquis Oraibi to the cañon is about 75 miles in a straight line, and could be traversed in six or seven days with guides from there. Moreover, the

Moquis would have led Cárdenas toward the beginning of Marble Cañon, that is, in a more northerly direction to what is now called Lee's Ferry, at the mouth of the Paria, or, a little further up, to the old-time Indian crossing known after Escalante passed over it as "The Crossing of the Fathers." Here the walls are low, and Cárdenas could have crossed over and examined the other side.\* At least the Indians would have mentioned the fact that the walls grew less toward the north, and Cárdenas would have also spoken of it. H. H. Bancroft, apparently ignorant of the topography of the region, gives a map, tracing the trail along the edge of the cañon to this low point.† Pedro de Sotomayor was the chronicler of this expedition, and at Cibola, Cárdenas gave Coronado a written report of the journey. So far as I am able to ascertain this has never been seen.

I am of opinion that Cárdenas started for the cañon from a point much, very much, further away than the present Moquis towns, and was guided by Indians who did not know the region of the Grand Cañon very well. I conclude that he must have reached the chasm somewhere between the Little Colorado and Diamond Creek, and probably between the latter and Cataract Creek. The *Relacion del Suceso* states (Winship, p. 575) that the river "comes from the northeast and turns toward the south-southwest at the place where they found it." This applies to the portion above Diamond Creek. Had it been that part at the mouth of the Little Colorado the deep cañon of this latter stream would certainly have been mentioned, for it is a striking feature. At the mouth of the Little Colorado, too, the river turns to the *north-west*, and not *south-southwest*. It is true that Cárdenas might have reached this stretch of cañon from the Moquis towns, but it is not likely that the Moquis would have taken him so far away to give him a glimpse of the cañon, when it would have been immensely easier to have gone up to the head of Marble Cañon on the great Indian highway to what is now Utah. The *Relacion del Suceso* (Winship, p. 574) says Cárdenas went only 50 leagues west of "Tuzan," but as the writer is not so reliable as Castañeda, I prefer the latter's estimate of 20 days. Twenty days of hard travel southeastward from the part of the Grand Cañon indicated above would put the starting point of Cárdenas at the site I give to

\* The writer is well acquainted with the Grand Cañon country from personal inspection, having been a member of Powell's Colorado River Exploring Expedition in 1871-72-73, and having spent much time since in the contiguous regions.

† "Nevada, Colorado and Wyoming," p. 27.

Tusayan, in the neighborhood of Silver City, N. M., 20 leagues northwest of my approximate location of Cibola. This was not too far for him to have travelled in the 20 days. I have travelled easily in the West on horseback, with a pack mule, over a snowy and slushy road, more than 300 miles in 10 days, therefore it is not assuming too much to count Cárdenas's 20-day journey at, say 350 or 400 miles.

After Cárdenas returned from this Cañon river, nothing further was attempted in that direction (Winship, p. 490). It is probable, therefore, that neither the Moquis towns nor Zuñi were seen in 1540-42.

The costume of the Cibola women was much like that of the Moquis of to-day. Especially was the hair of the young women dressed the same. This is described by Castañeda thus, "their hair is coiled above the two ears in two wheels that resemble the puffs of a woman's headdress" (see original text, Winship, p. 450).<sup>\*</sup> This is the peculiar style of hairdressing that has given to the Moquis girls the title, in the vernacular of the Southwest, of "side-wheelers." I have never seen it anywhere but in the Moquis towns. In Winship's monograph on Coronado are several pictures that show this unusual fashion, opposite pp. 539, 543 and 536. Its peculiarity renders it worthy of note, for if I am right about the location of Cibola, it shows a great similarity of the customs of the former population of southern New Mexico with those of the present Moquis, also indicated in Castañeda's other statements.

Coronado did not wish to proceed till he had news of the main body of the army approaching under Arellano. But having information of the province of Tiguex, and also of Cicuye, he sent Hernando de Alvarado with a company to reconnoitre that region. Tiguex, according to Castañeda, was "*toward the north*" (buelta del norte, p. 451, Win.) from Cibola about 40 leagues, with the rock of Acuco in between. Alvarado travelled five days to reach this Acuco, and three more to the Tiguex towns on the River of Tiguex, the Rio Grande. From Tiguex he went to Cicuye, where he met an Indian from further east, who was nicknamed "the Turk," because of a resemblance to the men of that race. This Turk told a marvellous tale of the country far eastward, which he

<sup>\*</sup> Ternaux, p. 163, translates this: "et retroussent leurs cheveux derrière les oreilles en forme de roue, ce qui ressemble aux anses d'une coupe." The resemblance to the handles of a loving cup is at once apparent, but in the original it is "cofia"—coif. Winship has the Spanish text "*cosia*," but it looks quite as much like cofia in the MS.



called Quivira, and Alvarado took him along on the return to Tiguex, from whence he intended to inform the General of all he had learned. At Tiguex he found Cárdenas preparing winter-quarters for the army, which was now nearing Cibola, and here Alvarado waited for the General to arrive. Cárdenas executed Coronado's orders concerning quarters and clothing for the troops with great brutality, and in the course of his demands he burned one of the villages. The province revolted. Battles followed, and finally a siege which lasted fifty days. During this time all the Spaniards became established at Tiguex as headquarters, and Coronado paid a visit to Cicuye, laying his plans for explorations eastward to the rich Quivira that the Turk told about.

Cicuye being the easternmost of all the pueblos was the natural point of departure for the plains country. Cicuye was seventy leagues toward the east from Cibola (as I locate it the direction is rather N. E.), but only twenty-five leagues from Tiguex. Coronado examined the country pretty thoroughly before the siege of Tiguex came to an end.

The Tiguex people, who fled to the mountains, could not be induced to return while the Spaniards remained in the country, but all the other towns involved in the revolt surrendered, among them being several called Quirex. This group was seven leagues north of Tiguex. Tiguex being about 40 leagues north from Cibola,\* fixes it about at San Antonio Station, and seven leagues north from this along the river puts Quirex on the site of modern Socorro. Later, while Coronado was pushing eastward, and the main army had returned from the east, Francisco de Barrio-Nuevo was sent from Tiguex to explore the upper river, while another party was ordered southward along the river. The latter reached a distance of eighty leagues or more below Tiguex. Barrio-Nuevo arrived at a town called Braba and Valladolid by the Spaniards. This was the furthest up the river, and was built on both sides with a connecting bridge made of squared pine timbers. It has been identified with modern Taos, but Taos is built on the Rio Taos, a small branch, while at Braba, Castañeda says: "The river is deep and very swift without any ford" (Winship, p. 511). "Tiguex is the central point," says Castañeda in speaking of *all* the villages (Ternaux, p. 182; Winship, p. 525), and Valladolid the last going toward the northeast.

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\* Winship translates the sentence: "tiguex quarenta leguas o mas la buelta del norte" (original text, p. 451. Winship), as "40 leagues or more to Tiguex, the road trending toward the north," p. 519. The three words, "the road trending," do not belong here, *buelta* meaning "toward." Ternaux translates this, p. 165: "Tiguex est situé vers le nord, à environ quarante lieues."

Now, if Tiguex was in the centre of the villages, and Valladolid to the northeast, it follows that Cibola, the first group, was southwest as much as Valladolid was northeast, and not west as it has been located; southwest then along the River of Tiguex, that is, on a line from Valladolid extended through Tiguex to the south. If Castañeda had meant that Cibola was due west of Tiguex he would have said so. But he says, "It is 130 leagues, ten, more or less, from the farthest point that was seen down the river, to the farthest point up the river, and *all the settlements are within this region.*"\* That is, beginning on the Rio Grande at Valladolid, and measuring down along the stream 130 leagues, gives us the limits north and south, where all the towns they saw were situated. He says not a word about leaving the river abruptly and going westward 60 leagues to find Cibola (at Zuñi). ALL the towns were between Valladolid and the southernmost point they saw, 130 leagues along the river. This southernmost point was 80 leagues below Tiguex, and consequently Tiguex was 50 leagues below Valladolid. Counting from the location I have assigned to Tiguex at San Antonio, northward along the river, 50 leagues puts this Valladolid not at Taos, as it has heretofore been located, but about the site of Cochiti or San Ildefonso. And 80 leagues southerly along the river places the last point seen on the river about 20 or 25 miles below El Paso. Recapitulating, he says, "the settlements and people already named (Winship, p. 526) were all that were seen in a region 70 leagues wide and 130 long in the settled country along the River Tiguex." In other words, none of the settlements were more than 35 leagues from the river, and within the north and south limits of 130 leagues from the town of Valladolid. Ternaux translated this 30 leagues by 130. According to his rendering the area plotted on the map apparently took in Taos, but according to Winship's the area reaches only to Cochiti or San Ildefonso. Zuñi does not fall within the area at all. I have laid this region down on the accompanying map, the darker shading with outline continuation being the area according to Ternaux's translation, and the wider section that according to Winship. All the towns the Spaniards saw were within this region. Zuñi lies outside of it to the westward, and the Moquis towns, 100 miles or more *still further* northwest.

Cibola was the *first* province within this area but not on the river.† As the river makes a great bend eastward about opposite

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\* Winship, p. 525.

† That is, Cibola was the first and most southerly place they met with *coming up*, in this inhabited area, while Valladolid was the last to the north, and Cicuye the last in the easterly direction.

the location of Cibola, and the Spanish approach was from the southwestward, they did not investigate the lower portion of the river till after they had visited the upper part.

Forty leagues north of Cibola and central in this defined area was Tiguex. North of this again was Quirex, 7 leagues. These two sites have been variously placed by different investigators, ranging from Socorro for Tiguex, up to Bernalillo for the same town. Bandelier favors the Bernalillo site, and this has been generally accepted. It is, however, too far north according to my views.

Acuco, the town on the rock, was between Cibola and Tiguex, three days southwesterly from the latter. It has been wrongly identified with the modern Acoma because it was on a rock. This ought not to have had as much weight as it has had in the identification of the town. Cliffs and mesas were favorite building sites with the Pueblos, and the Spaniards frequently speak of towns built on a rock. These natural barriers, so common in the cliff-broken Southwest, were seized upon as safe building sites by the house-building Indians. Acuco, therefore, was a small village built on a precipitous mesa about 25 leagues north of Cibola and 15 southward from Tiguex, in the foothills 15 or 20 miles back from the river.

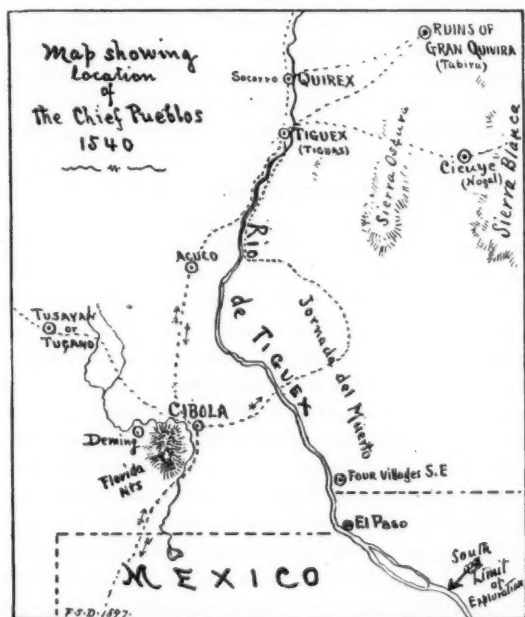
At Tiguex there was a spacious valley two leagues wide. Eastward from Tiguex, but not bounding this valley necessarily, was a snowy range. Ternaux put this range west.\* Back at the foot of this range were seven villages, four on the plain and three on the skirts of the mountain.† Seven leagues north were the seven Quirex towns already noted. Forty leagues northeast was Hemes. (Winship translates this *northwest* in his English.‡) Four leagues north or east was Acha, and southeast, distance not given, was Tutahaco, with eight pueblos. I put Tutahaco a few miles below Tiguex, mainly east of San Marcial. After Arellano arrived at Cibola with the main army, Coronado ordered him in twenty days to

\* Ternaux, p. 166. "Elle est bornée, à l'occident, par des montagnes tres-élevées," but the Lenox MS. has it east "a el oriente."

† This range was probably the Oscura combined, perhaps, with the Jicarilla and Sierra Blanca behind, which might appear to be part of the same mountains.

‡ Winship, p. 451. I will give here the original text of Castañeda, from Winship, p. 451, which I compared with the Lenox MS. and found correct. I draw lines between the sentences. Winship divides incorrectly and repeats 40 leagues.—"tiene a el norte a quirex siete pueblos a siete leguas | tiene a el nordeste la provincia de hemez siete pueblos a quarenta leguas | tiene a el norte o leste a Acha a quatro leguas | a el sueste tutahaco provincia de ocho pueblos." There is no punctuation in the original.

proceed to Tiguex by the *direct* road, that is up the western side of the river by way of Acuco, and, taking 20 men (Winship, 492), he went to this province of Tutahaco. It took eight days to reach it, and part of this time there was a great lack of water. He probably struck across the Rio Grande about east of the Florida range and passed up the Jornada del Muerto to Tutahaco. Thence he went up the river to Tiguex. The route is approximately given on the small map printed with this paper. At Tutahaco Coronado



heard that there were other towns still further down the river than he had been (Winship, p. 493), and these were probably the four villages seen later by the officer who went down 80 leagues below Tiguex, probably near the point where the Texas line cuts the Rio Grande. These four villages were southeast, though they were near the river, because the river makes a great bend to the east (Winship, p. 525). This passage has always been misunderstood, and the existence of the bend denied, because the other towns were placed too high up. The bend does exist, as any one can see by a glance at the map of New Mexico, and it is also a striking feature of the topog-

raphy. When Castañeda says in this case "southeast," he probably means southeast of Cibola.

There were seven villages along the road to Cicuye, which were under the rule of Cicuye. I have, however, been unable to fix either of them or Cicuye with any certainty.

Forty years after Coronado's exploration, Don Antonio de Espejo came up the Rio Grande from Mexico, and after passing a certain point met with a great many house-building Indians. This was probably the province of Tutahaco. Not far from this he came to a province he called Tiguas, in one of the towns of which he found statements "that Francisco Vasquez Coronado was in this province."\* Six leagues further up the river he found a place called Quires, which I identify with the Quirex of Coronado. Then northerly 14 leagues, he came to Punames, where there were five towns, the greatest being Cia. Then northwest five or six leagues to Ameies, where there were seven towns. Then westerly, 15 leagues, to Acoma, and further westerly, 24 leagues, to Zuñi (or Amé).

Admitting the identity of Espejo's Acoma with the Acoma of to-day, let us go backward on his trail from there and see what is the result. Easterly 15 leagues on a line with Zuñi, puts Ameies on the Puerco, near Los Cerros, where there are ruins, then five or six leagues southeast takes us to about Belen, and 14 leagues southerly from that place lands us close to the town of modern Socorro, or almost exactly on the site of the several Quirex towns of Coronado as I place them. Then the six or seven leagues south makes *Espejo's* Tiguas and *Coronado's* Tiguex identical. The Tiguas of Espejo and the Tiguex of Coronado were then the same place, and on the same site that I assigned to Tiguex, counting up from my location of Cibola. Tiguex, then, is pretty accurately located near the present station of San Antonio, a few miles north of San Marcial. Coronado and Espejo both found it there. Measuring again southward from Tiguex, the 40 leagues puts Cibola once more in the vicinity of the Florida mountains, and on a line with Tiguex and Valladolid. Espejo also states that Acoma was *northwest* of Quirex, and it has always been assumed that he made a mistake. Whenever the directions the early writers give do not coincide with modern theories, the early writers are asserted to be wrong. When Castañeda says there is a great eastern bend in the Rio Grande the modern authorities deny it, as it does not fit their ideas of where Coronado and the others ought to have gone. If Espejo or any other writer of that time makes a statement which does not fit our

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\* Hakluyt.

assumptions, we must either admit the discrepancy or find a solution other than the charge of error. Espejo states that Acoma was northwest of Quires, and so it falls according to my arrangement of the 16th century towns. I believe the location of Quires at Socorro (and Quirex also) to be correct, so that this and Tiguex, 7 leagues below, may safely be used as a base for other locations. Everything will probably be found to agree with this when properly understood; there are some points that must at present be left unreconciled, for example, Espejo's statement that he found at Zuñi some of the Indians that remained behind from Coronado's expedition, and also the legend that Estéban was killed at the site of modern Zuñi.\* Just how these will eventually be adjusted to the site of Cibola in the Florida Mountain region it is impossible now to say. We must not lose sight of the fact that after Coronado's return to Mexico the results of his journey were well-nigh forgotten, and when Espejo went into New Mexico he had not the faintest idea of Coronado's route. The names Coronado gave rivers were forgotten; and the peninsula of California was called an island just as if Alarcon had not proved the contrary in 1540, and it was so charted on the maps for a very long period, fully a century. Finally Coronado's route was marked out to the Pacific Ocean. It is not safe, therefore, to place much reliance on statements outside of the authentic writers of Coronado's immediate period, so far as his movements are concerned. And as there are two copies of Espejo's report, even that must at present be accepted cautiously. It is plain that his original document has suffered at the hands of copyists in some points, notably in the name of Zuñi, which in one version is called Amé. Where he is exactly in accord with Coronado they check each other, as in the case of the location of the towns of Tiguex and Quirex. The reason that Acoma is not mentioned by Castañeda is that probably the Spaniards of his time did not see it. They appear not to have pushed far to westward of the river, except in the single instance of Cárdenas and Tobar, to the Grand Cañon and Tusayan, respectively. All the towns the Spaniards saw were within the area defined by Castañeda, but this does not prove that they saw all the towns in that area.

The arrival of the Europeans on this continent introduced several new diseases among the natives, which spread with astonishing rapidity and deadly effect. The races here were a fresh field, and these diseases were rapidly fatal. Small-pox and scarlet

\* I am informed that there is another tribe called Zuñis, in N. Chihuahua, who sometimes range into New Mexico.

fever and measles were chief ones. These depopulated towns, and in conjunction with famine and the inroads of the wild tribes on one hand, and the equally savage European on the other, not to mention internecine wars, the poor Pueblo, earliest to cope with the whites, was driven to the wall.\* There seems to have been a recoil towards the north, towards mountain and cañon fastnesses, which went forward with considerable rapidity about the end of the 16th century, and produced a new arrangement of the homesites of many Pueblos. It is evident then that we cannot place reliance on our present knowledge of the ethnographic condition of the Southwest prior to the 18th century. After the insurrection of 1680, more changes occurred, till finally the positions of the villages were not at all as they were in 1540. Even in 1540 there were ruins. Castañeda and other writers mention them. The forces were already at work, and had been at work probably for some time, that were changing the distribution of tribes. The occupation of towns and localities was also not so permanent as has been assumed. A change of site was frequently made for one cause or another, so that a ruin does not, and did not, necessarily mean that the former occupants had vanished from off the face of the earth. While not so shifting in their habitations as the migratory tribes, the Pueblos were nevertheless Indians and consequently not stationary.† Ruined structures are found everywhere, from mountain and cliff heights to the barren depths of the Grand Cañon,‡ where every little patch of available soil was in times past utilized. I am told that the Queres could not have been at Socorro in the time of Coronado and Espejo for the reason that they never lived as far south, but I answer that they might have lived anywhere so far as evidence goes before the insurrection of 1680, and the fact that both Coronado and Espejo found them on the site of Socorro in the 16th century is the best evidence obtainable on that point.

Various other villages are mentioned by Coronado, but their location is not vital to my argument, so I shall not try at this time to fix their positions, with the exception of Cicuye, the beginning of my Buffalo Plains Division of the exploration. Cicuye was 25

\* Bandelier thinks the malarial character of the Mimbres may have had something to do with the abandonment of that valley.

† "With the exception of Acoma there is not a single pueblo standing where it was at the time of Coronado, or even sixty years later."—Bandelier, *Final Report*, pt. I, p. 34.

‡ I have myself seen numerous ruins in the bottom of the Grand Cañon, and in the other cañons of the Colorado and its tributaries.



leagues\* easterly from Tiguex. Striking an arc with this radius we find the location of this town limited to Gran Quivira Ruins, to the vicinity of Nogal or to the country in between. Pecos, the site heretofore assigned, is completely excluded, as it is altogether too far off. Castañeda speaks of a well-fortified town called Ximena, *between* Quirex and Cicuye, proving that there was a road that way. At present there is a ruin between Socorro and Gran Quivira that might have been this Ximena. It is possible that Gran Quivira was Cicuye, but it will take a careful examination of the ground to determine the situation of Cicuye with any degree of accuracy. Castañeda says of Cicuye, "It is square, situated on a rock, with a large court or yard in the middle, containing the estufas." (Winship, p. 523.) No spring of any kind has been found at Gran Quivira, yet at Cicuye in 1540 there was water in the centre of the town and Espejo speaks of it as half a league from the Vacas river. The Ruins of Gran Quivira lie on a hill or mesa, of gray limestone. It was still inhabited after 1600 (Bandelier, Part II., Rep.), and had it been the Cicuye of Coronado some word would have indicated it, probably, though not necessarily. Two churches, now in ruins, had been erected there, showing an early intercourse with the priests. Friar Luis, who was with Coronado, remained behind in Cicuye, but whether he influenced the natives much does not appear, as he was killed before any communication was again possible.

"A large pueblo exists at Nogal, about 25 miles north of Fort Stanton, near the Sierra Blanca" (Bandelier).† This may have been Cicuye. At any rate the pueblo must have been between this and Gran Quivira if it was not one or other, and it was probably on the headwaters of one of the streams like the Hondo, tributary to the Pecos. At Gran Quivira we should have to accept the theory of the disappearance of a large branch of the Rio Grande.

The special importance of locating Cicuye is in the fact that it was the last pueblo to eastward of the Rio Grande on Coronado's road to the buffalo country. It is therefore the key to the eastward march. It was probably fully 125 miles south of Pecos, the site heretofore assigned to it. The effect of such a southerly position for Cicuye would be to throw the eastern march of the army far south of any line heretofore suggested, and would explain the silence concerning the Canadian River, after crossing the Pecos.

Coronado left Tiguex for Cicuye, according to his own state-

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\* Winship, p. 503.

† Nogal is northwest of Fort Stanton.

ment, on April 23d, 1541, but Castañeda says May 5th. After a brief stay there they crossed mountains, Capitan or Jicarilla, for the plains were across mountains from Cicuye, and after four days' journey they came to a river with a large, deep current, which flowed down toward Cicuye, and they named this the Cicuye river. (Win., p. 504.) This was the Pecos River. They probably bore a course from Cicuye (Nogal location) about E. N. E., striking the river somewhere near the mouth of the Rio Hondo. They built a bridge here to cross on. The Indian called Turk was now leading them to the wonderful realm of Quivira, where riches in such abundance would be theirs, that the wealth of Aladdin would be poverty in comparison. In ten days the army was well out on the plains of Texas, and, besides the new animal, the buffalo, they met a new kind of Indian living in portable lodges made of buffalo hides. One of these Indians said he had once seen four men like themselves in this country, and the Spaniards decided that he referred to the Alvar Nuñez party. Castañeda states positively that "Cabeza de Vaca and Dorantes had passed through this place." (Win., p. 505.)

Food now began to grow scarce, except buffalo meat, of which they had a surfeit. They at length turned more to the southeast, and finally Coronado became convinced that the Turk was leading them astray. He therefore called a halt and had a council of officers. They were now probably somewhere in the vicinity of Glen Rose, Texas, having come about as far as Claude or Paducah before turning to the southeast, under the Turk's wavering guidance. This fellow, it seems, was only trying to lose them on the plains, so that the country might be well rid of them. The result of the conference was that Coronado should go on with 30 picked men, while the army under Arellano should make its way back by the most direct route to Tiguex. The army were not eager to go back empty-handed, and the General agreed to send messengers in eight days to let them know if they could come on. But the word that came was only a repetition of the order to go back. They could not conquer the hope that somewhere beyond these interminable stretches of weary plain there must be riches waiting to repay such toil and privation as they had endured. They had declared their willingness to die with the General, but he, man of wisdom, preferred to see them live. They had travelled 37 days, of 6 or 7 leagues a day, to reach this point, equal, they thought, to 250 leagues.\* They went back by a more direct road in 25 days,

\* The Spaniards used to count their steps in estimating distances. Even without such a method, it is well established that men acquire remarkable accuracy in estimating distances, and also a keen perception of direction.

besides stopping to hunt (Win., p. 509). After deciding to change the plan, they all went on one day further together, to a stream in the midst of good meadows, to camp till the matter should be fully settled. From this point, which was possibly the Brazos, Coronado continued his journey with the picked men northerly for more than 30 *short* marches in all (Jaramillo, Win., p. 589), through a well-watered country. After a number of days, not noted, but probably not less than 20, they came to an important stream, which they called the Saint-Peter-and-Saint-Paul, because of the day of their arrival. This was probably the Canadian at its most southerly bend. They crossed to the north side, opposite Shawnee Hills, and followed a bend northerly to the mouth of Little River, where they struck more easterly (N.E. by E.) across to the Arkansas, reaching it near the mouth of the Canadian. Here and in between the two large streams were the "settlements" the daring explorers had travelled so far to see, and Quivira, land of fabulous riches, was comprised in a few flimsy, straw-covered Indian villages. The false guide had been strangled before this. They turned back three or four days to a place where they secured dried corn, and picked fruits for the return. But they remained 25 days in this region of Quivira, "so as to see and explore the country."\* They could now see mountain chains again,† and these were probably the Cavanial, Sans Bois and Boston ranges, all clearly visible from the vicinity of the mouth of the Canadian. Jaramillo says, "the country was a beautiful one. I have not seen a better in all Spain, nor in Italy, nor in France, nor in any country where I have been in the service of his majestie."‡ This points to the edge of the humid region in the neighborhood of the west line of Arkansas. It was very fertile country, the land "being very fat and black, and being very well watered by the rivulets and springs and rivers." It may have been with one of his exploring parties from here that Coronado reached the latitude he mentions, the 40th degree.§ As the latitude observations of the time were universally wrong, no reliance can be placed on this one of Coronado's. There is a difference between Jaramillo and Coronado as to the number of days' journey after leaving the main army. Coronado says 42. It is probable that Coronado added several days belonging to an inde-

\* Coronado's letter, Winship, p. 583.

† Castañeda, Winship, p. 528.

‡ Ternaux's translation of Jaramillo.

§ "Coronado went 25 leagues through these settlements," *Rel. del Suceso*, Win., p. 577.

pendent trip he made on to the northward after establishing temporary headquarters at the place mentioned. He possibly reached, therefore, about the neighborhood of Fort Scott, leaving the 30 days of Jaramillo to mean the distance to the rendezvous. The river called the Teucara, heard of beyond, would then be the Missouri. At the rendezvous Coronado put up a cross bearing the words: "FRANCISCO VASQUEZ DE CORONADO, GENERAL OF AN EXPEDITION, ARRIVED AT THIS PLACE."

On the return trip they went as far as the Saint Peter on the trail they had followed out, but there the guides turned to the right and went by a more direct road. The main body on the return had met the Cicuye River 30 leagues below the bridge built before, and about 20 days (120 leagues) above the mouth of this stream.\* This would be just below Seven Rivers. Thirty leagues up from Seven Rivers would place the bridge about at the mouth of the Hondo. The army followed up the river to the bridge, and then apparently some river to Cicuye. This must have been the Hondo. It could not have been the Cicuye, for that stream was four days from Cicuye.

Coronado prepared for further explorations the following year, but in a tilting bout being seriously hurt by a fall from his horse, he decided at length to abandon further explorations and take the army back to Mexico. Had he carried out his first intention, he would probably the next year have reached the Mississippi and the Great Lakes.†

"I have done all that was possible to serve your majesty," he writes to the emperor. "The best that I found is on the River of Tiguex, but it cannot be colonized, because it is more than 400 leagues from the Sea of the North and more than 200 from that of the South, and there is no means of communication."

It is said that the Viceroy was displeased with the barren result, but this seems to emanate from Castañeda, who was disgruntled by the outcome. There is no evidence to show that Mendoza treated him any differently than before (Win., p. 402).

Coronado resigned his office of Governor‡ of New Galicia in 1545, and is prominent no more in the history of Mexico, but this was probably because he was tired of exploring and office-holding.

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\* Cast., Win., 510.

† It is interesting to note that Mr. Jo. A. Wilson, of Lexington, Missouri, has in his collection a halberd found in that region, and supposed to have been dropped by Coronado's party.

‡ Coronado was the last military governor.

Coronado had conducted one of the longest and largest exploring expeditions in history, and he had done it successfully. If the regions were barren and the Indians poor, it was not his fault. Had there been in New Mexico a second Aztec realm, he would have conquered it and have administered the affairs justly and wisely. As it was, there was nothing to be gained by occupying the land at that time, and he displayed the best of generalship in retiring as he did. His name must ever hold a first place in the annals of the Southwest; and the numerous Christian churches to be found in use and in ruins throughout the scene of his conquest, testify to the zeal of his countrymen, who often consecrated the cross with their blood.

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To recapitulate, the route of Coronado, as I understand it, was as follows: through the Mexican Mountain Division from a point near the intersection of the 109th meridian with the coast, say from the place now called San Miguel, slightly east of north between the 109th meridian and the Sierra Madre, to the neighborhood of the Pass of Carretas, where the range was crossed. Through the Rio Grande Division from the neighborhood of the Pass of Carretas, northward to about the site of modern Cochiti or San Ildefonso (possibly as far as Taos) with Cibola near the Florida Mountains; Tusayan northwest near Silver City; Tiguex about at San Antonio Station; Acuco between Cibola and Tiguex a little west of the river at Cuchillo, or perhaps further west near Fairview; Quirex 7 leagues north of Tiguex, about on the site of Socorro; Tutahaco at San Marcial east of the river; Acha 4 leagues north or east of Tiguex, probably one of the Tiguex towns; Hemes 40 leagues northeast of Tiguex near the present Pecos ruins; Valladolid near the site of Cochiti, or Taos; Cicuye 25 leagues east of Tiguex near Nogal, or between this and Gran Quivira. The present Moquis towns, Zuñi and probably Acoma not seen. Through the Buffalo Plains Division from Cicuye (Nogal location) over the Sierra Capitan possibly E.N.E. or through the Cañada José and then E.N.E. to the Pecos near the mouth of the Hondo; then N.E. by E. to about Paducah, Texas; then S.E. to about Glen Rose, Texas; then N.E. by N. to the Canadian at the Shawnee Hills; then N.E. by E. to the Arkansas not far above the mouth of the Canadian; then a general reconnaissance of that region, as far north perhaps as Fort Scott.

Concerning the statement of Castañeda that Hemes was northeast of Tiguex, I would say that he was probably right. Winship

translates the word *northwest*, as before noted, through error. There is nothing to indicate that Castañeda made a mistake in writing northeast. The fact that the Jemez of to-day is northwest of Bernalillo, the site given by Bandelier to Tiguex, proves nothing, nor does the location of Espejo's Ameies prove any mistake. Espejo's Ameies was on the Puerco near Quelites, or Los Cerros, which would be north from my Quirex and Tiguex, but it is quite reasonable to assume that there was another settlement of the Jemez tribe in 1540 just where Castañeda states, 40 leagues *north-east* of my Tiguex, or about the neighborhood of the ruins of Pecos. The former occupants of the Pecos ruins were Indians who spoke the Jemez idiom, and were therefore of the same stock.\* Why then should we think that Castañeda made a mistake, in this particular, except to help out a lame theory? H. H. Bancroft, as noted above, does the same thing when Espejo says Acoma was N. W. from Quires, this not agreeing with *his* location of Quires. He says therefore that *Espejo* made a mistake and should have said *Southwest*! In the distribution of the towns as I place them it is not necessary for me to accuse the *early* writers of mistakes. They were not such blunderers as certain charges would indicate, but on the other hand display an astonishing accuracy, where they relate their own experiences and observation. There is of course a possibility always that some mistakes were made in copying, but they seem to have been rare so far as the Castañeda MS. is concerned.

In conclusion I would add that I have done the best I can at this time to explain my locations of the 16th century pueblos of New Mexico and the route of Coronado. Being so entirely at variance with all previous investigators it is a difficult matter to elucidate, as I have been unable to use their labors to any great extent and have had to rely upon the writings of that period. Some of the documents that would throw light on the matter have never been found, but I hope in time to add to the present argument additional testimony, until the matter is conclusively settled.

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\* Bandelier Investigations, Part II, p. 129.

## WASHINGTON LETTER.

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WASHINGTON, D. C., DEC. 15, 1897.

**FOREST CONSERVATION.**—A notable advance has lately been shown in the intelligent appreciation on the part of the public of matters relating to forest conservation. During the past season notable additions have been made to the knowledge of the forests of the country, leading ultimately, it is hoped, toward definite provisions for the proper use of the forest resources of the country. In addition to the detailed surveys which have been carried on by the U. S. Geological Survey under the Department of the Interior, different bureaux of the Department of Agriculture have continued work along related lines. For the Division of Forestry, Dr. Bernhard E. Fernow, chief of the division, has made an extensive reconnaissance in the West, visiting first the forestry stations in the Dakotas and Nebraska and then examining the Black Hills. Later he set on foot work at the Experimental Station at Bozeman, Mont., and continuing westward visited the forests of the State of Washington and in particular those in the vicinity of Mt. Rainier. During a portion of the trip he was accompanied by Dr. C. A. Tichonoff, Inspector of the Forestry Corps of Russia and Counsellor of State. Dr. Tichonoff under direction of the Minister of Agriculture and Crown Domain has spent about three years in the examination of the forests and forestry management of France and Germany, and has also visited other portions of Europe, going to England and thence to America, in order, it is understood, to obtain information bearing upon questions of future competition in the matter of timber supplies. The department which he represents has in charge six hundred million acres of land, mainly in forest, and is bringing into the market in Siberia and the Caucasus large areas of valuable timber.

Mr. Frederick V. Coville, chief of the Forestry Division of the Department of Agriculture, has returned from an examination of the great Cascade Forest Reserve in western Oregon. The points to which he has given particular attention have been those connected with sheep grazing. Many friends of the forestry movement urge that for the protection of this and other great forests sheep must be rigorously excluded. On the other hand influential



citizens in the State of Oregon who are interested in its material development believe that the forest reservation should be abolished, especially if directly or indirectly the grazing of sheep is thereby limited, for a great part of the prosperity of that part of the country depends upon wool and mutton. Between these extreme views, both earnestly advocated, there is every shade of opinion, and the efforts of Mr. Coville have been directed to ascertain facts such that advice might be given officially by the Department of Agriculture to the officials of the Department of the Interior charged with the preparation of administrative rules.

A careful examination of the area has been made, it being traversed in many directions by means of a light pack train. Mr. Coville has camped with the sheep herders, followed the course of their migration, talked with them and listened to the arguments of their bitter opponents; he has attempted to measure the injury done by the sheep and to estimate at the same time the value of the industry to the community, weighing one against another. It is probable that regulations can be made, permitting the grazing of sheep on a great part of the reservation, and excluding them from localities where actual damage can be done either to the seedlings or to the beauty of resorts frequented by visitors. It will be necessary, however, to make stringent regulations concerning the number of sheep on each range, and to insure to each sheep owner the continued use of a definite tract for a number of years, so that he may properly protect this from over-grazing. At the same time the sheep owner thus protected must be held responsible for fires which are liable to occur upon or near his range, for it has been shown that some fires doubtless have been caused by sheep herders, although they cannot be chargeable with all of the crimes of this character usually laid at their doors. If forest fires could be absolutely prevented by excluding the sheep men, this latter course would no doubt be pursued, but, since fires do occur in regions where the sheep have never ventured, it is evident that the exclusion of the sheep men is not the only remedy for the evil.

The American Forestry Association held its Sixteenth Annual Meeting in Washington on December 8th, re-electing Gen. Francis H. Appleton of Boston as its president. The report of the Executive Committee called attention to the progress in forestry legislation, and showed that through the long continued efforts of the Association Congress had directly or indirectly been induced to take action. Although it had not been possible to secure as complete legislation as desired or needed, yet the efforts of sixteen

years have been crowned with a small measure of success. The reports from various States demonstrated a growing public sentiment in the East in favor of State ownership and control of various areas, for the purpose of protection of the water-shed of streams and for furnishing timber supplies, as well as affording great parks for the recreation of the people. In this respect New York State has led by the purchase of great areas in the Adirondacks; Massachusetts has followed in the acquisition of lands for its metropolitan parks, and Pennsylvania has also made provision for holding in forests wild lands sold for taxes.

The action of the National Irrigation Congress, which met at Lincoln, Nebr., on September 29-30, indicates the growing public sentiment of the West in the importance of forestry conservation. A resolution was introduced and passed without a dissenting vote to the effect "that the President of the United States be memorialized, as soon as a proper and adequate form of administration shall be provided, to withdraw from entry or sale under the Act of Congress of March 3, 1891 all public lands which are of more value for their timber than for agriculture or for their minerals." This resolution was ably introduced and clearly explained by Lieut. George P. Ahern of the U. S. Army, now stationed as Military Instructor at Bozeman, Mont. In the course of his army life Lieutenant Ahern has had long experience in the West, and has become one of the most earnest advocates of a business-like administration of the public forests. This resolution is one of the most radical ever introduced and passed by a representative Western assembly in favor of forest protection, and is especially significant of the education of the public, following the clamorous outbursts of last spring against the reservation of even a portion of the public forests.

COAST SURVEY.—On the first of December Dr. Henry S. Pritchett assumed the duties of Superintendent of the Coast and Geodetic Survey. Dr. Pritchett is a native of Missouri, and since 1881 has been Professor of Astronomy in Washington University, St. Louis. His appointment to the office of Superintendent has met with warm approval in scientific circles in Washington, and he is welcomed as a worthy successor of Dr. T. C. Mendenhall and of the scientific men who preceded him. It is hoped and believed that Dr. Pritchett will maintain the Survey upon the high plane upon which it has been so successfully conducted by these men and from which since 1894, the year of the retirement of Dr. Mendenhall, it has been in danger of falling through the introduction

of politics into its organization. Dr. Pritchett is familiar with the work of the Survey, not only from his general knowledge as an astronomer, but also by direct connection with its operations at various times in the past, having served as acting assistant in gravity determinations in Australia, Singapore, Japan and elsewhere. He thus has the advantage of an intimate knowledge of many of its methods, and on the other hand is not hampered by being closely bound to the traditions of the past or by the intimacies or prejudices, which a man brought up in the office must necessarily possess. There is no question but what his appointment to this high position was due to his merit alone, and that considerations of political expediency have not entered into it.

NICARAGUA CANAL.—The Board of Commissioners, together with engineers and assistants, sailed from New York on December 5th to begin examinations of the route of the proposed Nicaragua Canal. This work was authorized by an appropriation in the last bill for sundry civil expenses of the Government, and has been placed under the direction of the Department of State. By the wording of the Act the Commission is "to continue the surveys and examinations authorized by the Act approved March 2d, 1895, as to the proper route, the feasibility and cost of construction of the Nicaragua Canal, with the view of making complete plans for the entire work of construction as therein provided." The appropriation available is \$150,000. Under the terms of the law the work is in charge of an officer of the Army, an officer of the Navy, and an engineer from civil life. The army officer detailed is Col. Peter C. Hains, formerly in charge of improvement of Potomac River; the naval officer is Rear-Admiral John G. Walker, who has recently served on the Lighthouse Board; the engineer from civil life is Mr. Lewis M. Haupt, of Philadelphia. The U. S. S. *Newport* has been placed at the service of the Commission, and having conveyed the party to Nicaragua, will await their movements, and be prepared to bring back the officers when their examination has been completed.

In addition to the surveyor and assistants employed by the Commission, two experts have been detailed from the U. S. Geological Survey; the one, Dr. C. Willard Hayes, to make a thorough study of the geology and of the results obtained by borings, being given charge of twelve boring parties; the other, Mr. Arthur Powell Davis, to make examinations into the hydrography of the region. Dr. Hayes has had long experience in field work in various parts of

the United States, particularly in the southern Appalachians, and also in Alaska. He is well qualified to study the phenomena of rock disintegration and of questions bearing upon the stability of earth slopes and of foundations. Mr. Davis has also had wide experience, beginning as a topographer on the Geological Survey in 1882. He has mapped a considerable portion of the arid regions, and later has given his time exclusively to hydrographic investigations, being in direct charge of field work of river measurement and of reservoir surveys. He has been detailed to conduct all investigations of stream flow, evaporation, rainfall and sedimentation. The matter of hydrography is of particular importance in discussions of the feasibility of the Nicaragua Canal, and one of the most striking features in the previous reports upon the Nicaragua Canal has been the absence of all reliable data upon the subject. In view of the thousands or even hundreds of thousands of dollars spent in surveys, it is almost incredible to find such a lack of systematic observations of quantity of water flowing in the streams, and of fluctuations in volume. If, during the past ten years, observations of rainfall and river flow had been maintained at an annual cost of a few hundred dollars, it would now be possible to discuss with confidence certain items of expenditure for which approximations must be made. Records of this kind would not only save the expenditure of thousands of dollars on the present survey, but would give a certainty to its conclusions which cannot otherwise be had.

**DEATH OF MR. HUBBARD.**—In the death of Hon. Gardiner Greene Hubbard, the City of Washington has lost one of its notable men and one who has of late done much for the promotion and encouragement of scientific investigation. Mr. Hubbard became a Fellow of the American Geographical Society in 1889, but has mainly contributed to the diffusion of geographic knowledge through his activity as President of the younger Society at Washington. He was born in Boston, Mass., on August 25, 1822, the son of Samuel Hubbard, a Justice of the Bench of the Supreme Court of the State of Massachusetts. He was descended from English ancestry who, coming to the shores of New England, became prominent in the early history of the Commonwealth.

Mr. Hubbard graduated from Dartmouth College in 1841, later entering the law school at Cambridge, and completing the course was admitted to practice in 1843, opening an office for himself in 1848, and having a considerable number of important cases before

the courts of Massachusetts. In 1873 he was compelled to seek a milder clime, removing to Washington, where he continued his profession until 1878, when he retired from law to devote himself to the interests of the Bell Telephone Company, of which he was the projector. For five years he controlled and directed this enterprise, rendering it a practicable and highly serviceable institution. He continued to hold the office of director until his death. Going to Europe, he there introduced the telephone and organized the International, the Oriental, and other companies, obtaining important concessions from the Russian Government and making the service there the best of any in Europe. While living in Massachusetts, Mr. Hubbard was president of the first horse railway company in the State, and was also President of the Cambridge Water Works and of the Cambridge Gas Light Company.

Through a mishap to one of his daughters by which she lost her hearing, Mr. Hubbard became interested in matters concerning the teaching of the deaf to speak, and after investigating various methods of instruction he gathered a few pupils and opened a school which he maintained at his own expense for several years, initiating a movement which has spread to all parts of the country. He was for many years a member of the Board of Education of Massachusetts, and represented that State as one of the Commissioners at the Centennial Exposition in Philadelphia. Later he was appointed chairman of a special committee to investigate railway mail transportation, and largely to his labors is due the present organization of this important service. Always refusing to accept public office on the ground that it would impair his usefulness as a citizen, he has acted as the impartial adviser of several of the Presidents and of members of their cabinets in matters relating to scientific, educational and industrial affairs. He often appeared before committees of Congress to urge matters of national importance and took a prominent part in all of the movements looking toward the advancement of the republic along lines of the highest citizenship, being prominent in urging international arbitration and other measures tending to promote universal peace. As Regent of the Smithsonian Institution he took a keen interest in its management and endeavored in various lines to render it still more efficient and active.

N.

## RECORD OF GEOGRAPHICAL PROGRESS.

### NORTH AMERICA.

MODIFICATION OF THE GREAT LAKES BY EARTH MOVEMENT.—Allusion was made in the *Bulletin* (No. 3, 1897) to the paper read by Mr. G. K. Gilbert, at the Detroit meeting of the American Association, on the earth movements that are changing the altitude of the lands in the region of the Great Lakes, and thereby modifying the coast lines. In the Eighteenth Annual Report of the United States Geological Survey, Mr. Gilbert will have an extended paper on this subject, and meanwhile his Detroit paper has been printed in the *National Geographic Magazine* (Vol. VIII, No. 9). He says the geological history of the lake region has been characterized by a progressive change in altitude, the northern and north-eastern portions of the region becoming higher, so as to turn the waters more and more towards the south-west. The interesting question is whether the land is still rising at the north and the lakes still encroaching on their southern shores. In 1894, Mr. J. W. Spencer expressed the opinion that the movements were still in progress and predicted that they would result in the restoration of the Chicago outlet of Lake Michigan and the drying of Niagara. Mr. Gilbert has tested this question by the examination of existing records of lake heights, as recorded by gauge readings and by the establishment of a number of new gauge stations in 1896. Eliminating sources of error as far as practicable, Mr. Gilbert admits that none of his determinations is free from doubt, but the fact that all the measurements of the past twenty years and more indicate continued tilting to the southwest inspires confidence in the theory that the movements are still in progress. The computed mean rate of tilting, 0.42 foot per 100 miles per century, is not entitled to the same confidence as the fact of tilting.

Mr. Gilbert deduces some conclusions, assuming the mean rate of tilting to be as given above. The mean lake level is rising at Duluth 6 inches per century and falling at Heron Bay 5 inches. The submerging of the coast of Lake Erie at Toledo and Sandusky is estimated at 8 or 9 inches in a century. The estimated rise of Lake Michigan at Chicago is estimated at between 9 and 10 inches in a century. At the estimated rate of tilting, all the water of the Niagara River will, in about 3,000 years, have been diverted to the old channel near Chicago which was made by the outlet of a glacial

lake, and through this channel the waters now carried over Niagara Falls will be borne to the Illinois River, the Mississippi and the Gulf of Mexico. The older part of Chicago has already been lifted several feet to secure better drainage, and the time will surely come when other measures of protection will be demanded.

THE GEOLOGICAL SURVEY OF WEST VIRGINIA.—Dr. I. C. White has been elected Superintendent of the State Geological and Economic Survey of West Virginia, which was established by the Legislature at its last session. It is expected to begin the work of the Survey at once. Its headquarters are at the West Virginia University, Morgantown. The determination of the longitudes of all the county seats has been assigned to the Assistant Geologist, Professor J. L. Johnston, Professor of Civil Engineering. Professor S. B. Brown, who fills the chair of Geology at the University, has been elected First Assistant Geologist and Curator of the Collections.

ALASKAN AND CANADIAN NOMENCLATURE.—The Board on Geographic Names, at Washington, has passed upon the orthography of a number of names in the Upper Yukon region and along the overland routes to it, which often appear incorrectly spelled in the newspapers. When a geographic object is named after a white man there usually can be no doubt as to the proper spelling. Lake Lindeman, for instance, was named after the present Vice-President of the Bremen Geographical Society, but it often appears in the press as Lindermann or Lindemann. Lake Lebarge is incorrectly given as Labarge. The lake was named after Mike Lebarge, a member of the Western Union Survey party, which was establishing the route for a telegraph line to Bering Strait and Siberia when the news of the successful laying of the Atlantic cable, in 1869, suddenly put an end to its operations. In the same way the Lewes River is frequently printed as the Lewis River. The Board rules in favor of Teslin lake and river, which have been variously known as Hootalinqua, Hotalinqua, Teslin-hina, Teslin-too, etc. The terminations *hina* and *too* are said to mean "river" in the Indian dialects. It is not so easy to determine the proper spelling of aboriginal names, which is often purely arbitrary. The landing place at the head of Lynn Canal, where all freight for the Chilkoot Pass route is deposited, is known to miners, and the press and public generally as Dyca, but the Board has decided to adopt Dr. Dall's spelling Taiya. It will take a persistent educational process to engraft this reformed spelling upon public attention, and it is doubtful if the



effort is worth while or will succeed outside the Government publications, where the decisions of the Board are obligatory.

UNITED STATES DAILY ATMOSPHERIC SURVEY.—The Weather Bureau has issued a pamphlet with this title by Mr. Willis L. Moore, chief of the Bureau, in which he expresses the opinion that we have long since reached the highest degree of accuracy in the making of forecasts possible to be attained by surface readings. We are still ignorant of the mechanics of storms, and of the influence of the forces in the upper air that give inception to storms and supply the energy needed to continue them. This is the reason why the Bureau is now undertaking the exploration of the upper air by means of simultaneous observation, at a uniformly high level, from many kite stations. Professor Marvin devised appliances for this work with such success that apparatus is now easily sent up to a height of a mile in only a moderate wind. An automatic instrument has been invented which weighs less than two pounds and which records temperature, pressure, humidity and wind velocity. Before next spring, not less than twenty stations between the Rocky Mountains and the Atlantic will be taking daily readings at an elevation of a mile or more. These high level readings will be studied in connection with the surface chart made at the same moment, and it is hoped in this way to reach a better understanding as to the development of storms and cold waves and thus, eventually, improve the weather forecasts. There are many interesting problems to be solved by this investigation.

THE POPULATION OF CUBA.—The Spanish newspapers have recently published data concerning the population of Cuba at the time the present devastating war began. The figures for the six provinces are only approximate and are as follows: Matanzas, 300,000; Havana, 480,000; Puerto Principe, 72,000; Santa Clara, 360,000; Pinar del Rio, 320,000; Santiago de Cuba, 230,000; total, 1,762,000. Of this population, 1,228,000 was white, 490,000 negroes, and mixed bloods, and 44,000 Chinese and other Asiatics. The two chief cities, Havana and Matanzas, had respectively, 250,000 and 60,000 inhabitants. It is believed that the frightful devastation of war, pestilence and famine has reduced the number of inhabitants fully one-third.

THE STATE GEOLOGIST OF MISSOURI.—The *American Geologist* and the *Journal of Geology* have recently commented with severity upon the deplorable effect of political interference in Missouri with

the office of the State Geological Survey, all the scientific men of that bureau having been removed to make place for political henchmen. The *American Geologist* says that the only reason for the removal of Dr. Keyes as the head of the Survey was that he was not sufficiently active in practical politics. The new State Geologist is a man whose name has never been pronounced as a geologist. Not a scientific man is left on the Board of Managers, Prof. Shepard of Drury College having resigned, because he found the new atmosphere intolerable. The records and cabinet were consigned to an attic, field work has been abandoned and important papers that were nearly ready for publication were "not needed." The strictures upon the remarkable reorganization of the Survey have elicited a reply from the man at the head of it, which seems further to emphasize his qualifications for the place. Here is a specimen sentence or two addressed to two geologists of international reputation:

"Notwithstanding your scurrilous attack I am still here and ready to cope with either of you on any scientific question. As a partisan, a slanderer or a liar I cannot hope to compete with you successfully. But on scientific questions I am always ready for you.

"I will now remind you that every dog has his day. This is my day and the time is not far distant when your client [meaning Dr. Keyes, recently the State Geologist] will wish that he had carried his tracks along with him. That you and he have run up against the wrong man is only a question of time."

The exhibition Missouri is making of her Geological Survey shows the danger that lies in the controlling power of politicians. The work that is within the province of such surveys is of the highest economic as well as scientific value, and the law should place it beyond the power of "practical politics" to interfere.

THE JOURNAL OF SCHOOL GEOGRAPHY.—It is doubtful if any other periodical is more pervaded with the spirit of modern geographic ideas than this magazine, edited by Professor R. E. Dodge, Professor of Geography at the Teachers College, New York City, and devoted to the interests of the common-school teacher of Geography. It is full of suggestions and information, and the central idea seems to be Ritter's dictum that Geography is the study of the Earth's surface and man's relation to it; the influence of his geographic environment upon man and his influence upon it. An article in the October number by Ellen C. Semple deals with many of the geographic causes for the location of cities, a topic that is closely related to commercial geography; another article treats of

home geography or the study of geography from nature instead of text-books. Mr. Hayes's description of the Yukon district is a timely help for the teacher now that so much interest centres in that part of the world. Professor Davis has some extracts from an article on Ashanti to show how such extracts may be prepared for practical use in teaching by a couple of hours spent each week in a library, where a few geographical journals and important new books of travel may be consulted. A careful perusal of the Notes, in which the latest information and ideas of explorers and geographers are epitomized, will help the teacher to keep abreast of geographical progress.

THE FUR-SEAL CONFERENCES AT WASHINGTON.—In the conference held at Washington recently between representatives of the United States, Russia and Japan, these Governments agreed to desist from pelagic sealing for one year, and at the end of this period further arrangements will be made.

In the second conference, the representatives of this Government, Great Britain and Canada participated. The delegates were not empowered to recommend legislation for the improvement of the sealing situation in the northern Pacific and Bering Sea, but only to submit the facts concerning the fur-seal, upon which they agreed. The scientific experts were Prof. D'Arcy W. Thompson, of Dundee, representing Great Britain; Mr. James M. Macoun, of the Canadian Geological Survey; and our Government was represented by Dr. David Starr Jordan, of Stanford University, and Charles S. Hamlin, ex-Assistant Secretary of the Treasury. They were in essential accord upon the facts in the case. Here is a summary of the valuable conclusions they reached condensed from *Science* (No. 152):

The Pribylof herd has declined from year to year, and is not now more than a third or a fifth as large as in 1884. The most notable decrease was observed during the past season, but the number of breeding females in 1896-97 was still between 130,000 and 160,000. There is a high death rate among the pups, due to natural causes, and not more than one-third or one-half of them reach the age of three years. Thousands of them starve on account of the killing of their mothers by pelagic sealing. The catch at sea contains a marked excess of females, which is contrary to the statement of many pelagic sealers, who have declared that their catch included as many males as females, and sometimes more. Not all these females are nursing or pregnant, for many of them have lost their

pups through natural causes, and many others are yearling or two-year old females. Excessive pelagic sealing has led to a decrease in the herd, but pelagic sealing has recently fallen off in a greater ratio than the herd, thus producing a tendency towards equilibrium in numbers. In other words, the pelagic catch has fallen off one-half in three years, though the herd has not diminished by one-half in the same time. It is to be feared, however, that before an equilibrium could be reached only a small part of the present number of seals would be left; and even if pelagic sealing should now be stopped, its effects would be felt up to 1900, for half of the number of pups that died of starvation in 1895, for instance, were females, that were deprived of their mothers by pelagic sealing, and the progeny they would have had if they had lived will fail to appear in 1900. The final conclusion was that the herd is not in danger of actual extermination, as long as its haunts on land are protected and the protected zone around the islands is maintained. Both land and sea killing now yield only a small profit. This means that the point of commercial extermination, where the returns are incommensurate with the capital involved, has about been reached.

#### SOUTH AMERICA.

A NEW FOUND LAKE.—A report has been sent to the French Colonial Minister from French Guiana that a gold prospector named Ross has discovered a new lake south-east of the colony, in the region that is in dispute between France and Brazil. The lake is the source of the River Mapa Grande, which is south of the Carsevenne River and flows parallel with it. The lake extends in an east-west direction; is 35 kilometres long and four wide, and its waters are quite black. Many small streams flow into the lake from the surrounding hills, and the region is surpassingly rich in all the varieties of animal and vegetable life with which French Guiana abounds.—*Deutsche Rundschau*, Vol. XX, No. 2.

GEOGRAPHIC WORK IN PERU.—The Sociedad Geográfica de Lima is doing a great deal to advance geographic knowledge of Peru. The latest numbers of the *Boletín* report its work up to June, 1897. Last year, committees that were appointed to study the effect of high altitudes upon the human organism investigated the respiration, chest measurements, condition of the blood, etc., of Indians and other Peruvians living at different altitudes, or temporarily among the higher mountains. The Society expected to receive the committee reports before the close of 1897. The recent gold mining

excitement in Carabaya prompted the Society to send Señor Balta there to make geological investigations. Thus far, he has discovered fossils indicative of Lower Silurian and possibly Cambrian age, and he has accordingly pushed the geological history of Peru further back than was hitherto known. A new feature of the Society's work is the establishment of branches in the various parts of the country for the study of local geography. These branches have been opened at Piura, Tarma, Cuzco and Arequipa, and another is contemplated at Puno, from which contributions will be expected on the geography, climatology and archæology of Lake Titicaca. These geographic centres are already producing valuable papers, which will be printed in the *Boletín*.

THE PRINCETON UNIVERSITY EXPEDITION TO PATAGONIA.—Mr. J. B. Hatcher, of Princeton, started for Patagonia on February 26, 1896, to collect vertebrate fossils and recent organisms for the University and obtain photographs and data relating to the aborigines for the Bureau of American Ethnology. He was accompanied by Mr. O. A. Peterson, also of the University. They outfitted at Gallegos, on the east coast of Patagonia, some distance north of the Strait of Magellan, where they secured a light tent, five horses and a small cart with which they travelled along the coast to Punta Arenas, making large collections in palæontology and natural history. Then they returned to Gallegos and on Dec. 1, 1896, set out westward toward the southern Andes, seeing no human beings for four months and six days. Among the most important geographic features they discovered was a river fully equal in volume to the Santa Cruz, which they had ascended to its head in Lake Argentina. The river occupies a most unexpected position. "It heads in the pampas east of the Cordillera, but flows westward through a profound gorge and undoubtedly falls into the Pacific at some undetermined portion of the rugged Chilean coast. It is fed by glaciers, often of noble magnitude; it is swift and tumultuous so that it was found impossible to cross it, or indeed to trace its course, with the facilities at command, more than a part of the way through the cañon in which it traverses the Cordillera. "Mr. W. J. McGee, writing of Mr. Hatcher's work in the *National Geographic Magazine*, says that certain features of southern South America brought out through Mr. Hatcher's observations are especially significant to students of geographic development. "One of the characteristics of the region is the dearth of soil; another is the paucity of the flora, both in individuals and species, and the fact that the flora of

the pampas is evidently derived from that of the Cordillera; still another is the presence of saline lakes, of residuary character, scattered over the pampas. These features indicate conclusively that the Patagonian pampas have but recently been raised from the ocean bottom to form dry land." Mr. Hatcher has sailed again for Punta Arenas to continue his explorations. He has written a very interesting paper (*Nat. Geog. Mag.*, Nov., 1897), summarizing the results of his recent work.

#### THE POLAR REGIONS.

CAPTAIN SVERDRUP'S PROPOSED ARCTIC WORK.—The *Geographical Journal* (July, 1897) contained this paragraph:

"With Dr. Nansen's support and approval, Captain Sverdrup proposes, next year, to proceed in the *Fram* up Smith Sound for the exploration of the northern coasts of Greenland. One object of the expedition will be to examine the so-called 'palæocrystic' ice and, if possible, to determine whether it be due to accumulation from the resistance offered by the arctic lands north of America to the polar currents, and how far it extends northward before giving place to ice more like that encountered by the *Fram* in the eastern hemisphere. The possibility of reaching a high latitude by Smith Sound will, of course, much depend on the season, but, should the northern coast of Greenland be reached, it is hoped its exploration from the point reached by Peary on the east may be completed."

On January 12, 1897, R. E. Peary, C.E., U. S. N., read his paper before the American Geographical Society, outlining his plans for the explorations which he will begin next year, and naming as his base of operations the very region on the north coast of Greenland which, it is now said, Captain Sverdrup proposes to explore "with Dr. Nansen's support and approval." Mr. Peary's plans were copied in many of the geographical journals of Europe and everybody interested knew what he proposed to attempt, for months before Sverdrup announced a change of plans that is to take him to Peary's field of work. How well this is understood abroad is indicated by the address which Sir Clements Markham made at the opening of the session of the Royal Geographical Society on Nov. 8 last, in which he said:

"Mr. Peary intends to adopt the plan of taking Eskimo families up Smith Sound and, with their aid, to discover the most northern land to the north of Greenland. Captain Sverdrup, Nansen's companion, is fitting out the *Fram*, also with the intention of proceeding up Smith Sound and exploring the unknown part of the north coast of Greenland."

It was Peary who discovered and mapped the larger part of the north coast of Greenland, and his proposed headquarters during the coming campaign are in the immediate neighborhood of the still unknown western portion of the coast line, and it properly devolves

on Mr. Peary to complete the work of outlining the north coast of Greenland, which he has already so far advanced, and which everybody has known for months he intends to undertake. He distinctly included in his paper above referred to some of the most important features of the work outlined by Sverdrup. While desiring, first of all, to plant his food caches, next fall, as far north as possible on the west coast of the archipelago north of Greenland, he said that if the first season was unfavorable for a dash across the sea-ice to the far north it might be devoted to a detailed survey of the archipelago and a reconnoissance of the east coast as far south as possible, a work that would, of course, involve the completion of the outlining of north Greenland.

The earlier announcements of Captain Sverdrup's plans were to the effect that he intended to make investigations between Spitzbergen and Greenland; and he did not change his plan and declare his intention of going to the region which Mr. Peary is to explore until some months after Peary's project was well known. The *Geographische Zeitschrift* for August said that Sverdrup was going to the neighborhood of Peary's headquarters, next year, with a party of fifteen men, four years' food supplies, and many dogs and sledges. He is therefore preparing for a long campaign on the north coast of Greenland. *Petermanns Mitteilungen* says that the Norwegian Government will give him \$50,000 towards his outfit. The same Government assisted Dr. Nansen to carry out his last great work. It would be interesting to know what that Government would have thought of any one, who might have attempted to appropriate Dr. Nansen's scheme of exploration in the two years that elapsed between Nansen's announcement of his plans and the beginning of his actual work in the field. It is very rare, indeed, that an explorer attempts to occupy any district when another explorer is actively preparing to carry out a previously announced intention to explore the same district. So grave a breach of courtesy is not likely to be widely approved.

MR. WELLMAN'S NEXT ATTEMPT.—It is reported that Mr. Walter Wellman, of Chicago, intends to make another Arctic journey next summer. He proposes to sail from Bergen in June, and after forming a depot of provisions at Cape Flora in Franz Josef Land, he will travel northward to Cape Fligely, whence he hopes to start in 1899 towards the Pole.

THE JACKSON-HARMSWORTH EXPEDITION.—After its third winter in Franz Josef Land, this expedition returned to England on



Sept. 3 last, having left Cape Flora on Aug. 6 on the steamer *Windward*. The members of the party were Mr. Jackson, in command; Lieut. Armitage, R.N.R., nautical astronomer; Dr. Koettlitz, geologist and medical officer; W. S. Bruce, naturalist; and Messrs. Wilton and Heyward. Accounts of the first two seasons' work have already been printed in the *Bulletin*. As the party, in conjunction with the voyage of the *Fram*, had already proved that there is an open sea north of the small islands of which Franz Josef Land is composed, no attempt was made, during the last year, to reach a high northern latitude, but the time was spent in completing the survey of the islands, especially towards the west. Last winter was comparatively mild and calm and the scientific observations were continued throughout. The sledging expeditions, last spring, proved that the high, glaciated land behind Cape Mary Harmsworth is the farthest western land, and Mr. Jackson concludes that Gillis Land does not exist in the position usually assigned to it. The main geographical results of the three years' work are the proof that Franz Josef is an archipelago, and the determination of its northern coast. Considerable collections of geological, botanical and zoological material were made. The *Scottish Geographical Magazine* says (Oct., 1897):

"Besides this extension of our topographical knowledge of the archipelago, the most valuable results of the expedition will be the regular series of meteorological and magnetic observations. The meteorological data, when discussed with those of the *Fram* and of Nansen and Johansen, as well as with those of Ekroll in Spitzbergen and Peary in Greenland, will be of exceptional value."

THE SUMMER STATION IN SPITZBERGEN.—Spitzbergen is now connected with Europe by a steamer service in July and August, which enables many tourists to learn something about the polar regions. The steamer starts from Hammerfest, Norway, passes Bear Island to South Cape, Spitzbergen, and arrives at Advent Bay in Ice Fiord, on the west coast of Spitzbergen, which is the principal station on the coast. A hotel has been erected there containing over thirty small bedrooms, and equipped with a good culinary department and a sufficient number of servants. Sailboats are kept for excursionists and marine investigations, and occasionally a steamer makes the trip to Danes Island, from which Andrée started on his balloon voyage. During the summer, the Norwegian Government maintains a post-office at Advent Bay. A little newspaper is to be printed there in the French, English, German and Norwegian languages. (*Bulletin, Société de Géographie de Lille*, No. 9, 1897.)

## EUROPE.

THORODDSEN'S EXPLORATIONS IN ICELAND.—Mr. T. Thoroddsen, whose long and minute investigations in Iceland have made him well known, writes (*Globus*, No. 14, 1897), that he was able, last summer, to carry out his scheme of exploration in spite of almost continual fog and snow. He devoted last June and July to the Arnes and Rangárvalla districts studying the results of earthquakes there in recent years and making collections illustrating earthquake phenomena. He found many landslides, faultings, crevasses and other results of earthquakes. New hot springs are seen and others have disappeared. The inhabitants have repaired the damage to their property and are again living in peace. In August the explorer traversed the northern part of the Húnavatns district to the coast. He has now visited all the coasts, peninsulas and fiords and all the inhabited and uninhabited parts of the island, except the plateau region northwest of Langjökull, which will have his attention next summer. He adds that when this work is done he hopes to devote the rest of his life to quiet scientific pursuits, which have been much interrupted by his annual wanderings through Iceland.

DEVELOPMENT OF LARGE CITIES IN EUROPE.—In the beginning of the seventeenth century, Vienna and Madrid were already numbered among the cities containing over 100,000 inhabitants. In 1600 A. D. no city in Christian Europe numbered more than 200,000 inhabitants. When the eighteenth century dawned, Paris and London had passed the half-million mark, and each of twelve towns contained at least 100,000 souls. In the course of that century, twenty-three cities entered the list of cities having 100,000 population or more, but Seville, which had occupied a place in the list, had to be stricken from it. The largest growth in population was in St. Petersburg, Berlin, Hamburg, Copenhagen, Dublin, Bordeaux, Marseilles, Lyons, Barcelona and Valencia. Italy had five large cities, the Iberian peninsula and France, four each, Germany three, Austria-Hungary and Russia two each, and the Netherlands, Denmark and Turkey, one each. Eight cities each contained more than 200,000 inhabitants, Moscow, St. Petersburg and Vienna being the latest additions to this list. The largest growth was seen in St. Petersburg, with Dublin, Berlin and Naples following. In the eighteenth century the large cities increased in population only in proportion to the increase in the total inhabitants, while in the seventeenth century the increase of population in the cities was

proportionally greater than that of the country. (*Globus*, No. 11, 1897.)

## AFRICA.

SAVORGNAN DE BRAZZA LEAVES AFRICA.—M. Henri de Lamothe has been named by the French Government as governor of the French Congo to succeed M. de Brazza, who returns to France. De Brazza has been identified with African exploration and development for twenty-two years, since the day he started from France to ascend the Ogowe River in 1875, when he was twenty-three years old. Other explorers had endeavored to explore the Ogowe, but had been thwarted by the Pahuin tribe. In 1877 he completed his survey of the Ogowe and discovered the Alima tributary of the Congo, upon which, later, he launched a steamboat which he transported overland, forty miles, from the Ogowe. In 1880, he founded the station of Brazzaville, on the north side of Stanley Pool. It was his explorations throughout the district now known as the French Congo that enabled France to claim that large region which since has been one of France's colonies in Africa. He has established twenty-seven stations in the French Colony, including a number on the Congo River. The reason Stanley planted so many stations on the south bank of the river was to prevent De Brazza from crossing over and claiming a part of that territory in the name of France. After the boundary between the French Congo and the Congo Free State was fixed by treaty, a large part of Stanley's stations were abandoned, as there was no longer need of watching the movements of the French across the river. De Brazza has been governor of the French Congo since the Colony was organized. He may be said to have created the Colony, and France owes this vast possession to his assiduous efforts. He has spent most of his active life in West Africa, and he will always be remembered as one of the ablest of the pioneer explorers. He has always shown great patience and tact in dealing with the natives, and is one of the few men in Africa who have never failed to carry out the important enterprises they have undertaken.

THE POPULATION OF EGYPT.—The census taken on June 1 shows that the settled population of the country is 9,385,235, while in 1882 it was only 6,533,261. The semi-nomad population, including the Beduins, has risen to 172,696. There is a decrease in the number of nomads, which is now 96,302, against 98,196 in the former year. The total population of Egypt is, then, 9,654,323, with an increase of 2,872,283, or 42 per cent. The towns of Damietta and

Rosetta have diminished, while all the others show an increase in population. The largest cities and towns are: Cairo, 576,400 inhabitants; Alexandria, 319,700; Tantah, 57,300; Assiut, 42,100; Mansurah, 36,300; Zagazig, 35,500; Port Said, 35,000; Damanhur, 32,000; Damietta, 31,200. (*Scot. Geog. Mag.*, Nov., 1897, and *Boll. della Soc. Geog. Italiana*, Vol. X, fasc. 9.)

#### COMMERCIAL GEOGRAPHY.

GEOGRAPHICAL EXCHANGE ASSOCIATION.—The *Journal of School Geography*, (No 8, 1897) says that an association of teachers was formed a year ago by the New England Association of Educational Workers for the exchange of geographical material, and to secure from the Government and the commercial world products and laboratory material for use in teaching geography. The present membership is largely in eastern New England. Each member sends to the secretary, periodically, a list of what he can supply from his neighborhood and what he wishes to receive. These lists are supplied to each member in duplicate and thus exchanges are made easy. Plant, animal and mineral specimens from the sea-shore and country are exchanged for illustrations of processes of manufacture available in the cities. As the Association grows in numbers and influence it is hoped that much may be obtained from the Agricultural Department and the Consular service.

TECHNICAL EDUCATION IN GERMANY.—One of the chief reasons for Germany's rapid progress in manufactures and commerce is the superiority of her technical schools. For the second time, a British Commission has now reported that Great Britain is not keeping pace with Germany in the study and improvement of the technical processes of production and manufacture. The importance of this study is manifest when it is remembered that science and art now enter largely into the conduct of every industry. In the mining, iron and steel industries, for instance, science enters into every process by which coal is converted into coke, iron ore into iron, iron into steel, and steel into the thousand articles for which it is employed. It is the same with the textile industries. Germany is constantly experimenting in the technical schools with fibres, with the processes of weaving, dyeing and finishing cloths, and constant efforts are making in all directions to improve materials and methods of treating them.

TEA AND RICE IN CHINA.—China formerly produced tea only for her own consumption. The foreign demand was greatly

augmented by the opening of the treaty ports which largely stimulated production. About the same time, however, tea culture began to thrive in India and was developed there under more excellent conditions, particularly in Assam and Ceylon. The result is that the Indian tea trade has flourished at the expense of the Chinese trade, and the important falling off in Chinese exports is due also to the antiquated method of preparing the leaf for market. Nine-tenths of the export Chinese teas are produced in the provinces of Fokien and Chekiang, south of the Yangtse River and in the Island of Formosa, now a Japanese possession. The green tea of China, according to the *Revue Française* (August, 1897), is not admitted into Great Britain, under the provisions of the Adulteration act, though it is largely imported into the United States.

Rice is the chief food resource of the Chinese, and its exportation is absolutely forbidden by the laws of the empire. It is cultivated in the entire valley of the Yangtse and in the southern provinces of China. Every year a great number of junks laden with rice descend the great river to the large city of Chinkiang, where the cargo is transferred to other junks that carry it by way of the Grand Canal to Peking. In this way the provinces pay their tribute to the Government and, on some occasions, the tribute rice, in times of food scarcity in the northern provinces, has been largely distributed among the people. Two rice crops are harvested in a year.

CONNECTING BERMUDA AND JAMAICA BY CABLE.—The Direct West India Cable Co. was organized on Sept. 1 last with a capital of \$600,000 to lay a sub-marine cable from the Bermuda Islands, by way of Turks Island, to Jamaica. When this cable is laid Jamaica will be in direct cable connection with the North American mainland, as the cable from Bermuda to Halifax has been in operation for some years.

SUEZ CANAL TRAFFIC IN 1896.—The statistics of the traffic through the Suez Canal in 1896, as given in the *Revue Scientifique*, show that Great Britain, with 2,162 ships and 5,817,768 net tonnage, had 68 per cent. of the total tonnage passing through the canal. The British tonnage, however, was 4 per cent. less than in the preceding year, while the growing trade of Germany and Russia with the Orient was illustrated by the fact that the tonnage of Germany increased 14 and that of Russia 35 per cent. Japan's first appearance as a trader with Europe in her own vessels is denoted by a record of ten ships and 30,553 net tonnage. Not a single vessel with the stars and stripes at the masthead passed through the

canal. This item belongs in the category of Buenos Ayres, with only one American vessel in that port in a year, and Hamburg, which is said not to have seen an American vessel in thirty years.

THE GROWTH OF HAMBURG.—The development of German industry in recent years is vividly illustrated by the rapid development of its chief port, Hamburg, as shown in the figures recently quoted in *Le Tour du Monde* (Aug. 7, 1897). In 1882 the number of vessels entering the port from the sea was 6,189, a tonnage of 3,030,990; in 1889 the figures were 8,079 ships, or 4,809,892 tons, and in 1895, 9,443 ships, or 6,812,394 tons—52 per cent. more vessels and 125 per cent. greater tonnage in 1895 than 1882. The river port has grown in importance also, the number of vessels increasing from 9,380 in 1882 to 12,385 in 1889 and 14,135 in 1895, and the tonnage from 1,435,443 in 1882 to 2,349,527 in 1889 and 3,076,421 in 1895. The traffic is now so great that new docks are to be made. (*Scot. Geog. Mag.*, Sept., 1897.)

## MR. PEARY'S PLAN AND CAPT. SVERDRUP.

On the 12th of January, 1897, Mr. Peary, addressing the American Geographical Society, presented a project of exploration in the Arctic, epitomized by himself in these words:

The conquest of the North Pole, the complete delimitation of the Greenland Archipelago, the last of the circumpolar island groups, and the elimination from our maps of the unknown area between the 84th parallel and the Pole, are important geographical desiderata. This work can be accomplished without risk of life or health. It can be done at a comparatively small cost. The time for this work is favorable; the probabilities of success flattering; the requisite experience and inclination to undertake it available.

The project was submitted to the Council of this Society and approved, and in the early spring it was made known by publication in the geographical journals of America and Europe.

In planning this expedition, Mr. Peary undertakes no new enterprise. His explorations in North Greenland, begun in 1886 and steadily continued with characteristic energy and tenacity, are to be regarded as successive steps towards the attainment of the great design, now in process of execution.

As if by common consent, the explorers and scientists who, within the past ten years, have felt themselves drawn to Greenland, have refrained from entering upon Mr. Peary's chosen field of activity. This is in accordance with a tradition held sacred for three centuries. An unwritten law, dictated by the sense of honour and by manly sympathy with heroic endeavour, has been instinctively obeyed by the explorers who have made the grand record of Arctic discovery.

Capt. Sverdrup, who navigated the *Fram* on her immortal voyage, seems to be an explorer of a different stamp. He proposes,—as repeatedly announced for months past by publications of authority, such as *Petermanns Mitteilungen*, the *Geographical Journal*, the *Annales de Géographie*, the *Geographische Zeitschrift*, and others,—to set out in the summer of 1898 at the same time with Peary, following Peary's route and aims, adopting Peary's methods, utilising Peary's experience and necessarily interfering with his resources of men and dogs in North Greenland, in order to frustrate the labour of ten years and turn to his own advantage, in competition with Peary, all that has been accomplished by Peary's skill and forethought and indomitable courage.

There is no legal impediment in Capt. Sverdrup's way. He can do these things, if he will, and men will remember him as the one Arctic voyager whom they would gladly forget.

DECEMBER 15, 1897.

GEO. C. HURLBUT.



## MAP NOTICES.

BY

HENRY GANNETT.

Since our last notice the U. S. Geological Survey has issued twenty-six sheets, widely scattered over the country. Five of these are from New York, and are on a scale of 1:62,500, with a contour interval of 20 feet. In the eastern part of the State is the sheet known as Glens Falls, which includes the bend of the Hudson and the southern half of Lake George, with the mountains surrounding it, monadnocks\* rising from an old base-level. This sheet, with the Bolton sheet, lying north of it, includes the whole of Lake George, with its surroundings, and they will prove of great interest to the habitués of that beautiful region.

The Hoosick sheet lies mainly in New York, and includes a strip of western Vermont. It represents a portion of the old base-level, with monadnocks rising from it, and the valley of the Hoosick River eroded beneath it, owing to the recent elevation of the country.

The Olcott, Ridgeway and Lockport sheets are in the north-western part of the State, the first two upon the shores of Lake Ontario, showing a shore gently rising, with well-marked benches. The Lockport sheet lies farther inland and includes the escarpment which formerly limited the lake, and the higher bench southward, upon which flows Tonawanda Creek.

In Virginia is one sheet, Amelia, representing a base-levelled section of the Piedmont region.

In Tennessee are two sheets, Standingstone and Wartburg, on a scale of 1:125,000, with a contour interval of 100'. Both of these are located in the Cumberland Plateau, showing a region deeply dissected in some parts, alternating with broad stretches of level summit.

In Texas are two sheets upon a scale of 1:125,000. Of these the Brackett sheet is in the southern part of the State near the Rio Grande, and represents a semi-arid plains region, diversified slightly in the northeast by the valley of East Nueces River and its tributaries, and in the central-southern part by the Anacacho Mountains, a group of hills of no great height. The other, known as Eagle Mountain sheet, lies in the trans-Pecos region. It is traversed by

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\* An isolated hill, or group of hills, rising from a base-level.

the Rio Grande near the United States boundary line. It shows the characteristic features of west Texas, a broad desert valley with an irregular, trachyte range upon either side.

In North Dakota is one sheet, Casselton, upon a scale of 1:125,000, with a contour interval of 20'. This sheet, in the eastern part of the State, shows a broad plain of lake deposits, a portion of the bed of Lake Agassiz, rising into glacial hills, the Coteau des Prairies, upon the west.

In Wyoming are two sheets, Patrick and Hartville, on a scale of 1:125,000 with a contour interval of 20'. The sheets lie on the plains in the southeastern part of the State.

The surface is rolling and broken with many cliffs and mesas.

In Colorado are three sheets, Walsenburg, El Moro and Spanish Peaks, upon a scale of 1:125,000. They lie at the western border of the plains at the base of the Rocky Mountains, and the surface is somewhat broken by cañons and plateaux. In the southern part of the El Moro sheet is the Raton Mesa, rising 2,700' above the plain and capped with volcanic rock, to which it owes its existence. The Spanish Peaks sheet shows in the northwest the two peaks from which it takes its name; high, sharp, volcanic summits forming an eastward spur from the Sangre de Cristo range.

In Idaho is one sheet, Weiser, in the southwest part of the State. This is upon a scale of 1:125,000, with a contour interval of 100'.

In Washington is one sheet, Tacoma. It shows the city of that name with the shores of Admiralty Inlet. The land here represented is a fine example of glacial erosion and deposition.

In California are eight sheets, scattered about in different parts of the State. Three of them are in the Sierra Nevada and are known as Yosemite, Sonora and Big Trees. They are upon a scale of 1:125,000, with contour interval of 100'. They show the long, westward-sloping spurs of the Sierra, cut by cañons thousands of feet deep of the Mokelumne, Stanislaus, Tuolumne and Merced rivers. Yosemite and Hetch-Hetchy valleys are shown upon Yosemite sheet. The San José and Mount Hamilton sheets are south of San Francisco Bay. Their scale is 1:62,500. The former includes a part of the beautiful Santa Clara Valley, with the city of San José and a portion of the coast range in the west.

The latter is included entirely in the coast ranges representing a rugged country. Mount Hamilton, on which is the Lick Observatory, is located near the middle of this sheet.

The other three sheets are in the neighborhood of San Luis Obispo, showing a portion of the west coast and of the coast ranges

bordering upon it. These are Arroyo Grande, Cayucos and San Luis Obispo, all on a scale of 1:62,500 and with a contour interval of 50'. The Pacific Coast, as represented on these sheets, was plainly formed by elevation, since its outline bears no relation, whatever, to the inshore topography. It is being modified rapidly in details by deposits from waves and currents, which heap up the sands across the mouths of rivers, cutting them off or impeding their access to the sea.

Among the many charts, published by the U. S. Coast and Geodetic Survey, since our last notice, a few call for special mention. Among them are the following:

Upon one sheet are published, by photo-lithography, a chart of Lynn Canal, Alaska, scale 1:30,000, Funter Bay, Barlow Cove, Fritz Cove, William Henry Bay and Swanson Harbor. All these last are upon a scale of 1:20,000.

Upon a second sheet are charts of Shumagin, Semidi, Chiachi and Chirikof Islands, also Falmouth and Eagle Harbors on Nagai Island, Simeonof Harbor on an island of the same name, and Northwest Yukon and Northeast Harbors on the Shumagin Islands, Alaska.

U. S. Coast and Geodetic Survey. General chart of Alaska, scale 1:3,600,000, June, 1897. This, the latest edition of the Coast Survey's map of Alaska, shows many additions and changes, the result of recent surveys and explorations. Among these may be mentioned the course of Sushitna River, the high range between its head waters and the course of Tanana River and the low plains country westward drained by Kuskokwim River. The course of Yukon River has been improved, while the changes upon the Canadian side of the boundary, especially along the routes from the coast to the mining regions of the Yukon, have been greatly changed. The next issue will, probably, witness still greater changes in the map, as exploration during the past summer has been extensive.

Among the recent publications of the Hydrographic Office, U. S. N., are the following: Navigators' Guide Chart in English Channel with its Tides and Currents. Upon the map the land is distinguished by a brown tint and the sea by blues, the depth being indicated by intensity of shading and by soundings. As a graphic picture of the sea bottom this chart is very effective.

Magnetic declination and dip (over the earth) for 1897. (Mercator's Projection.) This instructive and valuable chart is a graphic representation of the results of many thousand observations

widely scattered over the earth. This map is one of the results of the excellent magnetic work in progress by Mr. G. W. Littlehales of the Hydrographic Office.

Since our last notice the United States Land Office has published new editions of the State maps of Washington, Oregon and Arizona. These are upon the scale of twelve miles to one inch. They are printed in colors, using black for lettering and culture, blue for all water features, while relief is represented by brown crayon shading. Reservations of various kinds, such as Indian, forest and military, are shown by various flat tints. The maps are published by photo-lithography by the Friedenwald Company, of Baltimore.

These maps are compiled primarily from the subdivision plats of the General Land Office, and so far as that information extends, they are, so far as concerns the drainage of the country, detailed and excellent maps. In areas not covered by the plats information has been obtained from a number of different sources, especially from the work of the U. S. Geological Survey, U. S. Coast and Geodetic Survey and from the postal route maps.

These maps show several distinct improvements over earlier editions. Owing to the extensions of Land Office and other surveys the areas of the States are much more fully represented. The blank spaces are fewer and smaller. The use of the three colors increases the clearness and legibility of the maps. The relief is represented much more fully and more correctly.

*Anderson's Sectional Map of Western and Central Washington, U. S. A.  
Compiled and Published by the O. P. Anderson Map and Blue Print  
Company, Seattle, Washington, 1897. Lithographed in colors.  
Topography is represented by hachures. Scale, 6 miles to an inch.*

This map represents about half of the State of Washington, being that portion north of Township 10 North, and west of Township 24 East.

This map is, in the main, a compilation from the plats of the General Land Office, supplemented, in areas not yet subdivided, by the results of railroad surveys, explorations, and the reports of prospectors. In such parts it is greatly generalized, and often incorrect.

It is to be noted that Steel's map of the Olympic region has not been utilized, and the representation of these mountains suffers in consequence. Nor are the explorations of Sarvent and Evans upon Mount Rainier represented. Still the map contains, in spite of its

inaccuracies, much valuable information, not embodied in other maps. Its cultural features are brought well up to date.

*Plano do Porto e Cidade de Dilly, levantado em 1870, por, etc., 2ª Edição, 1895. Comissão de Cartographia, Lisboa. Scale 1:3,000 approximately.*

A large scale chart of the town and harbor of Dilli, a port on the north shore of the Portuguese portion of Timor Island, East Indies.

*Plano Hydrographico do Porto de Loanda, Costa Occidental d'Africa. Escala 1:50,000. Comissão de Cartographia, 1896, 2ª Ed.*

A chart of the port of Loanda, Portuguese West Africa, showing the plan of the town and the adjacent stretch of coast, with soundings.

*Plano da Bahia dos Tigres, Costa Occidental d'Africa. Escala 1:120,000. Comissão de Cartographia, 1896.*

Tiger Bay is situated in the south of Angola, west coast of Africa. It is enclosed between a shore of sand dunes, 100 metres in height, and a low sand spit. Soundings are shown over the bay.

*Mapa de la República del Paraguay Con los Ultimos Datos Geográficos, por Cleto Romero. Escala 1:1,000,000.*

This map of Paraguay, on a scale of about 16 miles to an inch, accompanies a descriptive article published on the occasion of the Brussels Exposition, 1897.

The map is printed in colors, presumably to show the extent of forests, grassy plains, etc., but the explanation seems to be wanting.

*Soudan Français, et Côte Occidentale d'Afrique. P. Vuillot. Échelle 1:4,000,000.*

This map shows the coast of west Africa, from the mouth of Congo River, northwestward to Cape Verde, and extends inland to include Lake Tchad.

The streams are printed in blue and relief in brown hachures.

Since our last notice seven additional sheets of the geological map of France have been received. These are based upon the Staff Map, on a scale of 1:80,000.

Also two sheets have been received of the general geological map of France, on a scale of 1:320,000. One of these represents the island of Corsica.

The progress of the French in mapping Algeria is indicated by the receipt of four additional sheets. These are upon a scale of 1:50,000, relief being represented by contours and crayon shading.

The prevalence of forests is indicated by a green tint.

The work of the French in Tunis is represented by four additional sheets, all on a scale of 1:50,000; relief is represented by contours and crayon shading, and forests by a green tint.

The progress of the general map of northern Africa by the French Government is illustrated by the appearance of two additional sheets, on a scale of 1:2,000,000, relief being represented by crayon shading.

Two additional sheets of the map of Württemberg have been received. These are upon a scale of 1:25,000, relief being shown by contours and timber by conventional characters.

## BOOK NOTICES.

*Kleinasien's Naturschätze von Karl Kannenberg. Verlag von Gebrüder Borntraeger. Berlin, 1897. Pp. 278, with 31 Illustrations and 2 Plans.*

This book is significant of the growing interest shown by the Germans in Turkey and everything Turkish. Now that they have reorganized the Sultan's army, introduced into it compulsory military service, Krupp cannon and Mauser rifles, they look upon the late Turkish victory over Greece as in many respects a German victory. It is time for them, they believe, to make hay while the sun shines, by investing capital in the land which owes them so much, and which, they do not hesitate to say, has been saved from absorption by Russia through their timely intervention.

As the victory over the Greeks was won principally by the peasants and shepherds of Asia Minor in the Turkish army, it is towards that country that the Germans are strongly drawn.

Asia Minor has repeatedly been described as a field for archaeological research, but the author of the book before us has a purely utilitarian object in view. He proposes to turn the enormous expansion of German commerce, the increasing travelling fever of his native country, and its attempts at colonization into a fertile field, where capital is much needed. And in this he follows in the footsteps of no less a personage than Moltke himself, who long ago made suggestions towards the same end.

In fact, everything about the preparation of "*Kleinasien's Naturschätze*" bears a military stamp.

It is written by an artillery officer, and supplemented with notes by a lieutenant serving on the general staff. The very photographs, that serve as illustrations, were taken by captains of artillery and infantry, though, to be perfectly fair, several university professors were called in to pass upon various parts of the work.

The animus of the book may be best shown by quoting the opening sentences of the short Preface :

"The Turks are the Germans of the East as the Greeks are the French," says the author.

The reasons for this opinion are contained in a sentence, thirteen lines long, characteristically German, which would delight the soul of Mark Twain :

"This shows itself not only through the fact that the Germans,



in spite of the difference in religion, feel themselves drawn much more to the Turks than to the Greeks, while the French sympathize more with the latter, but this has shown itself especially during the late Greek and Turkish war, which reveals so many points of resemblance with the German and French war; on the one side the theatrical fighter's pose, the many bombastic words before the beginning, and during the fight at the start a bold *élan*, which, however, was soon broken by the first resistance—on the other side over against the attacks of the mobile and excited enemy, at the start utter calm and quiet, then—the awakening of the lion—a stroke like that of the German *Michel*, when he becomes angry."

Having delivered himself of this personal view on the Greek and Turkish nationalities, the author proceeds to write an admirable, painstaking and scientific treatise on the great natural wealth of Asia Minor. Every bit of information is so well-placed and tabulated that it may be found at once. The main purpose of the book is never forgotten, and yet much material of a special kind is vouchsafed under appropriate headings. The careful plan of the book makes room for etymological derivations when these bear upon names of places, for scraps of folk songs, popular sayings, and even for certain commands of the Koran, relating to the subjects treated. The pronunciation of Turkish and Greek words is made easy for Germans by special accents.

Lieutenant Kannenberg passes in review the animals, plants and minerals of Asia Minor, special stress being laid on those which possess a commercial value. We are told that the horse, once used by all Turks for meat and milk, can now be afforded only by the well-to-do; that the principal beasts of burden are donkeys, mules and camels; that the common draught animals are oxen and Asiatic buffaloes; and that sheep and goats form at once the greatest source of wealth in the country, and the entire meat supply. Pigs are not domesticated, but occur in a wild state in the forests.

The general reader is referred especially to the animals and plants characteristic of Asia Minor, such as the Angora goat, the buffalo, the jackal, the storks, which are such an amusing feature of the peninsula in winter, the many song-birds of passage, the trout in the mountain streams, the figs of the Maeander valley.

One regrets that the author has so little to say concerning the licorice root, which is an important staple of export. The superb anemones of many colors, which cover the hill-sides as with a Smyrna rug, also deserve more than mere mention.

Asia Minor, under proper conditions, could become the same superb granary which it once formed under the Roman Empire. It is capable of supplying half the world with tobacco. Cotton, now cultivated only on a small scale, might expand into a great crop. The mineral resources of the country have barely been touched.

It is confidently hoped that the railroads which are pushing into the interior, under the stimulus of English and German capital, will eventually reach the valley of the Euphrates, and connect Europe with India and southern Asia in general.

A full list of reference literature adds to the value of "*Kleinasien Naturschätze*." The illustrations are refreshingly new and to the point, giving, what is so rare in works of this kind, the life of the people as they are in action at work and play.

Lieutenant Kannenberg, after writing so fully and enthusiastically upon the great natural resources of Asia Minor in this volume, might in the future give us a second, in which the reason for the glaring poverty of its inhabitants is explained.

But such a further investigation would infallibly lead him to the subject of taxation. The tax-gatherer is the destroyer of Asia Minor. Not the earthquakes nor the floods, nor the droughts, nor the frosts play such havoc with the productive power of the country as he. The inhabitants are robbed of everything over and above what is required for bare subsistence, hence they produce no more than is absolutely necessary for life.

If German colonists intend to profit by the information contained in "*Kleinasien Naturschätze*," it will be the part of wisdom to get special rates in taxation from the Sultan before they invest their savings in the soil of Asia Minor.

W. D. McC.

*Impressions of South Africa.* By James Bryce, Author of "*The American Commonwealth*," "*Transcaucasia and Ararat*," "*The Holy Roman Empire*." 8vo. New York, The Century Co. 1897.

One may well ask, after reading this book: "If these are impressions, what are studies?" Mr. Bryce has told the whole story of South Africa, its past and its present, and has stated the problems of its future, with a lucidity, an impartiality and a soundness of judgment not to be called in question.

South Africa is the region south of the Zambezi River. It has three divisions: the low strip of coast varying in width from fifteen miles to eighty; the hills behind the coast, rising gradually into mountains from 3,000 to 7,000 feet in height, and in Basutoland,

west of Natal, to 11,000 feet; and behind the mountains the plateau, which covers seven-eighths of the surface of South Africa. The strip of swamp is broken at the Cape, and the Dutch settlers entered a healthy country, in which their posterity retains all the vigour of the race. The pure air and the table-land explain the success of the Europeans in South Africa.

Of the native races Mr. Bryce finds the Bushmen and the Hot-tentots in process of extinction, and the Kafirs full of vitality and increasing at a rate which gives some anxiety for the future. They will probably continue to outnumber the whites, and they must, in time, give up their tribal organization and live like Europeans. The situation in South Africa will then be almost exactly what it now is in the Southern States of the Union.

This is rightly regarded as the gravest question in the future of South Africa; but a more immediate difficulty exists in the conflicting rights and claims of the Dutch and the English.

So far as Cape Colony, Natal and the Orange Free State are concerned, there is nothing to disturb the concord of the Europeans. The cause of trouble is in the Transvaal, and the facts of the situation in the middle of 1897 are stated in these words:

The Boer population of the Transvaal is roughly estimated at 65,000, of whom about 24,000 are voting citizens. The Uitlanders, or alien population, five-sixths of whom speak English, are estimated at 180,000, of whom nearly one-half are adult males. These Uitlanders hold sixty-three per cent. of the landed and ninety per cent. of the personal property in the country. In December, 1895, their number was increasing at the rate of one thousand per week through arrivals from Cape Town alone; and though this influx fell off for a time, while political troubles were checking the development of the mines, it rose again with the renewal of that development. Should the Deep Levels go on prospering as is expected, the rate of immigration will be sustained, and by the end of A. D. 1905, there will probably be 500,000 Uitlanders in the Republic—that is to say, nearly eight times the number of the Boers.

Even if the disproportion were not so great as it is, the supremacy of the English would be established before long by the operation of natural causes. In South Africa, if anywhere, time is on their side, and they have only to exercise prudence and forbearance to win without a conflict.

Instructive and full of information, Mr. Bryce's book is admirably written and interesting from beginning to end. Three maps—one orographical, one political, and one of the rainfall—are added, and the printer's work is well done, with the exception of the hideous reformed spelling adopted, as in the word *sepulcher*. Why not spell it with *ker* or *cur*?

*Java, the Garden of the East.* By Eliza Ruhamah Scidmore, Author of "*Jinrikisha Days in Japan.*" New York, The Century Co. 1897.

It does not appear when Miss Scidmore visited Java, but she describes well what she saw.

The way of the tourist in Java is made hard by the Dutch regulations. He must hand in, within twenty-four hours after arriving, a statement of his name, age, religion, nationality, place of birth and occupation, with the name of the ship in which he came and the name of her captain.

A permit, or admission ticket (*toelatings-kaart*), is required to travel in the interior, and travelling for pleasure is not encouraged by the authorities. The tourist is obliged to make his journey for "scientific purposes."

Miss Scidmore emphasizes, at the outset, the contrast between the lovely island, with its gentle, attractive and innately refined people, and the suspicious, cold-blooded Dutch rulers, who mean to keep their paradise to themselves. They do their work well. Java is a model colony of a certain type, administered with an iron hand for the good of the masters, and yet with substantial justice. The island is cultivated from end to end, and traversed in every direction by roads and highways, smooth and solid and beautifully kept.

The social life is unconventional to an extraordinary degree:

there in the hotel was an undress parade that beggars description, and was as astounding on the last as on the first day in the country . . . . No formalities pass the equator when distinguished citizens and officials can roam and lounge about hotel courts in pajamas and bath slippers, and bare-ankled women, clad only in the native sarong, or skirt, and a white dressing-jacket, go unconcernedly about their affairs in streets and public places until afternoon.

Every afternoon, however, these unbraced persons meet each other in the full-dress uniform of Europe, and exchange the commonplaces dear to the civilised mind.

Buitenzorg (the Dutch for *Sans Souci*) deserves its name, according to Miss Scidmore. It is less than 40 miles to the south of Batavia, on the summit of a hill, 1,000 feet in height, and enjoys a clear, fresh air and cool nights, with a reviving shower of rain every day. Mere existence is delightful in such a place, and there is no business to vex the soul. Its great possession is the Botanical Garden, famous throughout the world.

Miss Scidmore visited the wonderful ruins of Boro Boedor, and Solo, where the last *susunhan* lives as a pensioner of the Dutch.

In the absence of the Baedeker and the Murray for which she calls, her lively book is a fair substitute for the intending traveller in this "finest tropical island in the world," and her references are generally correct. Cuba, however, does not correspond exactly to Java, geographically. There are 25 degrees of latitude between them. It is also a mistake to decorate M. Désiré Charnay with the *de*.

There are many illustrations and the book is attractively bound after Javanese designs.

*Hints to Teachers and Students on the Choice of Geographical Books for Reference and Reading, with Classified Lists. Prepared at the Request of the Geographical Association. By Hugh Robert Mill, D.Sc., F.R.S.E., Librarian of the Royal Geographical Society, Fellow of the Royal Geographical Society and of the Royal Scottish Geographical Society, Honorary Corresponding Member of the Geographical Societies of Paris, Berlin, Budapest, and Amsterdam. Longmans, Green, and Co. 39 Paternoster Row, London, New York and Bombay. 1897. 8vo.*

A helpful guide through the jungle, where many lose their way. The field of geography, as defined by Dr. Mill, includes everything that can be known, but his lists are made with brevity and discretion.

*Catalogue des Bibliographies Géologiques, par Emm. de Margerie. Paris, 1896.*

The collection of titles of geological bibliographies, issued a few months since by M. Emm. de Margerie, under the auspices of the International Geological Congress, is a volume of very great use to every student of geography, and hence this notice in a geographical paper. M. de Margerie has with infinite pains and care got together over 3,900 titles of geological bibliographies in all the modern languages in which scientific publications appear. The volume is divided into two parts, one containing general references and the second and larger having the references arranged geographically. Under the different countries the references are arranged in such a way that the student of special phenomena can easily find the particular subject he needs. The list includes general bibliographies, personal bibliographies, official government publications, periodicals, society publications, etc., and special bibliographies arranged according to stratigraphical sequence. The collection is very exhaustive and an indispensable aid to every working scientific

library. The thanks of geographers and geologists should be bestowed most liberally upon the conscientious and successful compiler.

R. E. D.

*Mazama. A Record of Mountaineering in the Pacific Northwest. Vol. I, No. 2. Crater Lake Number, published by The Mazamas, Portland, Oregon.*

The second volume of Mazama, the Bulletin of the Mazamas, that does for the northwestern mountains what the Bulletin of the Appalachian Mountain Club does for the eastern mountains, deserves more than mere cataloguing and shelving, for it contains a most excellent geographical study from all sides of Crater Lake in Oregon. There are other crater lakes, and Crater Lake is not the type, but it is a wonderful instance of lakes of such origin, and because of its origin, its history, its features and its beauty, deserves all the attention bestowed upon it in the last year or more. Mr. Diller, of the United States Geological Survey, has given us several official and popular accounts of this crater within a crater, but it has remained for the Mazamas to bring together the best of the known facts concerning this lake. The volume includes chapters on the Description of the Lake, The Discovery and Early History of the Lake, The Geology of Crater Lake, The August Vegetation of Mount Mazama (the name applied to the extinct volcano in which the lake is found), The Mammals of Mount Mazama, and U. S. Fish Commission's Investigations at Crater Lake, together with several other chapters of practical help to a geographer, but not dealing with this phenomenon.

The volume, for its quality and contents, for its illustrations, and its bibliography, deserves a warm welcome by every student of the physiography of the United States. The volume, of 160 pages, can be secured from the Secretary of the Society for 50 cents.

R. E. D.

## ACCESSIONS TO THE LIBRARY.

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## NOTES AND NEWS.

PORTUGUESE NATIONAL CELEBRATION IN 1898.—The Portuguese will celebrate, on the 17-20 May, 1898, the fourth centenary of Vasco da Gama's arrival at Calicut, the first Indian port entered by his fleet, which sailed on the 8th of July, 1497, from the point where now stands the Convent of Belem, erected by Emmanuel on the site of the chapel in which Da Gama and his comrades had prayed, the night before their departure.

The programme of the celebration, published some months ago, remains unchanged, with the exception of the proposed General Exhibition, which will not be held. In its place there will be a display of the types, the costumes and the traditional industries of Portugal and of the tribes and peoples of the Portuguese possessions.

It is hoped that every maritime nation will contribute, by the presence of war vessels in the harbour of Lisbon, to the commemoration of a voyage, second only to that of Columbus in its effect upon the progress of mankind.

THE THIRD ITALIAN GEOGRAPHICAL CONGRESS will be held at Florence in the spring of 1898, contemporaneously with the public honours to be paid to the memory of Paolo Toscanelli and Amerigo Vespucci, the two illustrious Florentines, whose names are associated with the history of discovery in the New World.

THE BULLETIN OF THE SOCIETY will be published hereafter five times a year, viz.: February 28, April 30, June 30, October 31, and December 31. There will be no change in the form of the publication, but each number will contain not more than 96 pages.

## TRANSACTIONS OF THE SOCIETY.

OCTOBER-DECEMBER, 1897.

RECEPTION OF DR. NANSEN.—A Regular Meeting of the Society was held at Chickering Hall, corner of Fifth Avenue and Eighteenth Street, on Saturday, October 23, 1897, at 8.30 o'clock P.M.

President Daly in the chair, and beside him sat Dr. Fridtjof Nansen.

Among the invited guests on the platform were Capt. Alfred T. Mahan, U. S. N.; Mr. Carl Lumbholtz, Civil Eng. R. E. Peary, U. S. N.; Mr. Karl Woxen, Consul, and Mr. Chas. Ravn, Vice-Consul, of Sweden and Norway, and three survivors of the Lady Franklin Bay Expedition: Capt. David L. Brainard, U. S. A.; Mr. H. Biederbick and Serg't Francis Long, U. S. Weather Bureau.

The following persons, recommended by the Council, were elected Fellows:

Archibald D. Russell (Life),	August R. Ohman,
Alletta Nathalie Bailey (Life),	Henry Biederbick,
Anthony J. Drexel Biddle, Phil.,	Eugene Underhill (Life),
Chas. L. Delbridge, Atlanta,	Ignatius R. Grossmann,
Capt. D.[L. Brainard, U. S. A.	

Dr. Fridtjof Nansen was elected an Honorary Member.

Mr. Chandler Robbins reported the Amendments to the By-Laws, proposed at the meeting held on the 12th of April, 1897, and moved their adoption. The motion was seconded, and the question having been put, the Amendments were adopted.

President Daly then addressed Dr. Nansen, as follows:

Dr. Nansen, our Council, availing themselves of the happy circumstance of your visit to the country, have asked you to this reception that they may present to you, in person, the gold medal founded by our late lamented Vice-President, General Cullum, and that the Fellows of our Society, of whom you see a goodly number here present, may have the pleasure of meeting you.

To me is allotted the agreeable duty of expressing, on their behalf, their appreciation of what you have accomplished, in the exploration of the Arctic, by the important and unexpected information you have brought back respecting its physical geography, and of the heroism, fortitude and cheerful endurance displayed in acquiring that knowledge.

You have told us of the little encouragement you received from the eminent Arctic explorers now living; that Admiral Sir Leopold McClintock, and also the majority of them, believed that there was no probability of ever seeing the *Fram* again when she gave herself up to the moving Polar ice, and that Admiral Sir George Nares said

that to push the vessel deliberately into the pack ice, was to lose all control over her movements, that she would be forced to drift helplessly about with the moving ice in which she was imprisoned, and that as to your theory that a vessel could be built that would resist and rise under the pressure of the ice, he said, that when once frozen in, the form of the vessel goes for nothing, and that there was no record of a vessel frozen into the Polar pack that was ever disconnected from it thereafter.

This was certainly very discouraging, and it recalls an incident told me by Admiral Farragut. It will be remembered by many present that during our civil war a fleet of foreign war ships, Russian, English and French, assembled in the harbor of New York, and Admiral Farragut, who was then in command of the New York Navy Yard, together with myself and some others, was selected by the city authorities to show the commanders and other officers of the foreign vessels our city institutions; on which tour the commander of the French Squadron, Admiral Farragut and myself were much together and became very well acquainted.

After the war was over Admiral Farragut, in a conversation in which the French admiral was referred to, told me this anecdote about him. He came off New Orleans when Farragut was preparing to capture that city, and being a neutral he was allowed to pass the Confederate batteries and go up to that city with his vessel. Upon his return he visited Farragut and said to him: "Admiral, I have seen everything, and while I am precluded in honor from giving you any particulars of what I saw, I have come to say to you, in all sincerity as a friend, that I know you cannot take New Orleans," and Farragut answered, "Admiral, you know what you can do, but how can you know what I can do?" "Of course," said Farragut to me, "I did not tell him that I was going to do what was then unknown in naval warfare, lash a wooden vessel to the side of the iron war steamers to receive the fire of the batteries as we steamed past them." And in somewhat analogous circumstances in this Arctic adventure you had your own idea of how a vessel could be constructed that might, as the *Fram* did, remain imprisoned in the ice pack all winter and successfully resist, as she did, the enormous pressure to which she was several times subjected and return as safe and as sound as when she entered the Arctic.

Like Farragut, you did not tell them how you could do it, but you did it!

It is gratifying to know that Sir George Nares, after the return of the *Fram*, with a manliness in every way worthy of him, wrote to you that she had proved that your theory was correct and that his skepticism was unfounded.

You have also stated that Sir George Nares was at variance with the theory upon which your voyage was undertaken, that is, that there was a steady drift of the Polar ice from the coast of Siberia, across the pole to the east coast of Greenland, but he insisted that the drift was essentially determined by the prevailing winds, in which you found that he was correct, while a few, such as Admiral Inglefield, Admiral Wharton, director of the English Hydrographic Department, and some others, believed in your theory.

My colleagues here will recall that I was one of the few. As the large part of the Arctic that had then been explored was a shallow sea, with an archipelago of islands, it was thought by many geographers that the unexplored part would prove to be of the same character, and assuming it to be so it appeared obvious to me that the great Siberian rivers descending into a shallow sea would create a strong and powerful current, sufficient to carry the drift ice across the Pole; the proof of which seemed to be the fragment of Siberian drift-wood found on the east coast of Greenland and the discovery there of relics of the *Jeannette*. It sometimes happens in scientific discoveries that the pursuit of one thing leads to the discovery of something



very different and quite as important, as was the case here, for certainly your discovery that the unexplored part of the Arctic, in the immediate vicinity of the Pole, was a deep sea of more than two thousand fathoms, with a warm current at the depth of 200 fathoms, running north, showing the connection of that warm current with the Gulf Stream and the Atlantic, is as important an Arctic discovery as has yet been made.

I have frequently declared, in my annual addresses before our Society, that the discovery, or attainment of the Pole, was a mere geographical feat, that what was important and valuable was a thorough knowledge of the entire Arctic basin ; that we could not know all that we ought to know respecting the laws of the currents of the air and of the waters until we know what takes place in the Arctic—until we know more of its physical geography than we do now, and it is in this point of view that the discovery of the deep sea in the vicinity of the Pole is so important and valuable.

In expressing my appreciation of the value of this discovery, I would also take occasion to refer to the admirable manner in which this three years' voyage of exploration and adventure is told. During my long life, and more especially during the thirty-four years that I have been president of this Society, I have read many narratives of Arctic exploration, and recall no one that has given me a more vivid impression of what occurred. I have felt, in reading it, as if I actually saw what was taking place, and its perusal has given me a fuller idea of what it is to struggle against the formidable obstacles encountered in the attempt to get farther north than I ever had before. And that journey of two men, yourself and Johansen, for more than a year, reaching as far north as 86.14, when you were compelled to turn back by obstacles that no human effort could overcome ; and that long, long return journey, struggling through rugged, drift and pack ice, monster floes, long lanes of open water lying across the way of your return, crossed frequently at imminent risk of life and always with great difficulty ; the intense cold, the daily discomforts, the Arctic wintering in inadequate huts, and the uncertainty in respect to food, where the dependence was upon such water or land animals as might be met with on or below the ice, present a picture of resolute perseverance and final success such as is rarely found in the history of exploration or adventure.

Before closing my remarks I feel called upon to say a word respecting the officers and crew of the *Fram* ; upon the ability shown in the selection of such a body of men ; upon the fraternity and good fellowship that existed throughout among all, officers and crew, and the fact that, while fully exercising on your part all the power and authority that is indispensable in the master of a vessel, you had the hearty, intelligent and earnest support of every one under your command. And what is rarely found in such explorations, that there should be no death, and even no sickness, and that the vessel and all of you should come safely back is a high tribute to the care, ability and forethought of the leader, whom we have the pleasure of welcoming here to-night.

It is my duty now to present to you our gold medal, and in view of what I have but briefly recounted, to say that it could not be more worthily bestowed.

Dr. Nansen, in reply, briefly expressed his sense of the honour conferred and his gratification at the welcome extended to him by the Society. Unprepared as he was, having landed in New York but three hours before, he could do no more than sketch, in such words as came to him, the story of the three years' work and its main results.

When he resumed his seat, Mr. Peary came forward, and said:

MR. PRESIDENT, LADIES AND GENTLEMEN :

There are many who believe Arctic exploration to be a waste of time and money and a serious hazard of life. It is not my intention to discuss this matter to-night. The fact remains that from the earliest days, when men dreamed of the ever sunny Eden of the Hyperboreans, far beyond the land of the Anthropophagi, till now, the region within that magic line which bounds the northern disk of midnight suns and noon-day nights, the Arctic Circle, has exercised a strange charm over men and women of all temperaments, all ages, all conditions of life, and will continue to exercise this charm until every foot of this mysterious land and sea has been charted. By no one is this charm more strongly felt than by a man, warm of blood, clear of brain, clean of muscle, filled with noble courage and inspiration and the eager desire to know more. In such a man the atmosphere of the Arctic regions, biting, but pure as the celestial ether, the infinite silence, the indescribable grandeur and desolation, touch and set in vibrant unison the highest, grandest, noblest chords in human nature.

There are no pages of England's history of which she is prouder than those on which are inscribed the work and the discoveries of her sons within the realm of noon-day night and midnight sun; there is no American that is not proud of the records of her noble men and officers in the Polar night; and there is no civilized man to-day, regardless of nationality, that is not proud of the magnificent accomplishment of Nansen in the fastnesses of the white North.

Modern Arctic exploration demands an intelligent appreciation of requirements and ingenious means of application, to an end that shall reduce the obstacles and dangers of Arctic work to a minimum, which will under ordinary circumstances eliminate danger. But joined to this must be a cool, determined, thoughtless courage (by thoughtless I mean that, once the danger has been looked in the face, it is given no further consideration), which, if the unavoidable emergency arises, can march steadily day by day, neck and neck, and elbow to elbow, and lie down at night side by side with the gaunt spectres, starvation and death, and yet by sheer force of that God-given attribute which lifts man above the brute,—intelligent will,—outrance them, and win the coveted goal. We see those attributes exemplified here to-night. Ladies and gentlemen, Arctic exploration makes *men*.

The last ten years have seen a revolution in matters of Arctic work. No longer do great expeditions go out and perish to the last man in the savage heart of the great night. To-day the effective work in the North is done by parties of two or at most three men. Nansen's magnificent sledge journey from the *Fram* northward to within less than four degrees of the Pole, and thence back to Franz Josef's Land, is an example. Modern Arctic exploration demands that the leader of the expedition shall be, not behind at headquarters or in the ship, but at the head of the advance party. There is where Nansen has always been.

Still more recently, has Nansen evolved a yet newer departure, that of drifting in a ship across the Polar basin, and his recent voyage, with its achievements, and the safe return of his party and ship, form a signal monument to his ability.

And what has he accomplished? Briefly, he has shown that he can build a ship that will survive a three years' battle with the Arctic ice.

He has discovered the existence of an entirely unsurmised deep polar sea; he has obtained a large amount of valuable scientific material which is now being worked up.

He has distanced by a magnificent bound of one hundred and seventy miles all previous efforts in the North. Though our own flag is thus relegated to second place in the race, I am sure no one of us bears Nansen ill-will.

He has demonstrated the limited extent of Franz Josef's Land, and practically the non-existence of other lands in the Siberian segment of the polar basin; thus eliminating that entire segment from further consideration as a possible route by which to reach the yet unscaled apex of the earth.

He has returned himself and brought his entire party back in good health and condition.

Perhaps no one, at least on this side of the water, is better able than I to fully understand and appreciate the meaning of those three years; the courage, persistence, fertility of resource and endurance, which in spite of moments of blackest dependency that no man living can entirely escape, kept him to the goal of accomplishment.

I know the vibration of all the chords which are noted in his own narrative of his work. And another thing which elicits our warmest admiration is that the inception, the execution and the splendid results of Nansen's expedition, are due entirely to the personal force, energy, push, ability and enthusiasm of one man, Nansen.

Nansen, I call you simply Nansen, because you have risen superior to any distinction that a title can confer upon you, we, over here, are interested in Arctic exploration; we feel that we know a little something of it, and that we can appreciate what you have gone through and what you have accomplished; and more than that we have the highest admiration for a *man*; that wonderful machine of blood and brain and muscle, which rules the world, and adjusts itself equally to the burning heat of the Equator, or the savage breath of the Pole.

Personally, and for the Society, and for the American people, I tender you the warmest welcome.

Capt. Brainard, the surviving companion of Lockwood, who in 1882 reached the Farthest North in latitude  $83^{\circ} 24'$ , expressed his admiration of the explorer who had carried his flag so much farther toward the Pole.

On the invitation of President Daly, the Fellows then ascended the platform and were personally presented to Dr. Nansen.

The Society then adjourned.

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A Regular Meeting of the Society was held at Chickering Hall, Fifth Avenue and Eighteenth Street, on Monday, December 13, 1897, at 8.30 P.M.

President Daly in the chair.

The following named persons, having been duly proposed to, and passed by, the Council, were elected Fellows:

Dr. Ralcy H. Bell,  
Samuel Howland Hoppin,  
William Van Slooten, C.E.,  
James C. Ayer, M.D.,  
Frank Montgomery Avery,  
Selden Bacon,  
Frederick Billings,  
Dr. J. S. Billings,

Milo M. Belding, Jr.,  
Frederick H. Comstock (Life),  
Charles W. Bradley,  
George G. Brooks,  
Mrs. William Combe,  
G. M. Corning,  
Mrs. Wm. T. Blodgett,  
Frank R. Chambers,

George H. Church,  
Rev. D. Stuart Dodge,  
Rev. William N. Dunnell,  
John E. Ellison,  
W. L. Cameron,  
Matthew Bunker,  
William L. Flanagan (Life),  
Edward Fitzgibbon,  
William J. Cassard,  
Rev. William M. Grosvenor,  
Henry Gade,  
Frederick de L. Booth Tucker,  
William E. Ferguson,  
Berthold Hochschild,  
Alex C. Humphreys, C. E.,  
John Noble Golding,  
Abraham Gruber,  
C. R. Heike,  
Frederick E. Hyde,  
Chester W. Chapin (Life),  
Mrs. Alla Doughty,  
L. I. Dubourcq,  
Theodore F. Jackson,  
G. Radford Kelso,  
Alfred R. Kimball,  
Morris W. Benjamin,  
R. Ogden Doremus,  
William A. Hoe,  
John E. Hudson,  
Frank Livermore, M.D.,  
William C. Lobenstine,  
John J. Hetzel,  
Edwin R. Dillingham,  
John S. Huyler,  
Clifford B. Hendricks,  
Cyrus J. Lawrence,  
John A. Garver,  
Frederick V. Green,  
Walter T. Hart,  
Goodhue Livingston (Life),  
Jacques Ballin,  
Rev. Joseph L. Hoey,

D. Greene,  
Franklin Burdge,  
S. H. Kohn,  
Jesse Larrabee,  
L. A. Heinsheimer,  
George C. Miller,  
Robert T. Morris, M.D.,  
Theophilus M. Marc,  
Edward C. James,  
A. J. C. Anderson,  
M. S. Kemmerer,  
S. Whitney Dunscomb, Jr.,  
T. M. P. Mills,  
Edward M. Muller,  
Prof. T. Mitchell Prudden,  
Rev. Edward Judson.  
Robert W. Parsons,  
Sol. Oppenheimer,  
George A. Hearn (Life),  
George W. Millar,  
William Decatur Parsons,  
G. E. Hagerman,  
N. F. Palmer,  
David Murray,  
Jacob Rubino,  
John D. Keiley,  
John E. McDonald,  
Mrs. Thomas Jefferson Owen,  
George Notman,  
George L. Nichols,  
Clifford Richardson,  
William H. Porter,  
Samson Lachman,  
H. L. Metz, M.D.,  
William F. Merrill,  
George G. Nevers,  
Frederick S. Gibbs,  
George Parsons (Life),  
August Eimer,  
Joseph M. Pray,  
George Lewis Prentiss,  
Frank Rothschild, Jr.,

W. H. Sheehy,  
Joseph Shardlow (Life),  
Louis Stoiber,  
Sidney Hendricks Salomon,  
Rev. John Chamberlain,  
Hermann Schaus,  
Frederic A. Tanner,  
Louis W. Stotesbury,  
Marcus Stine,  
John C. Travis,  
Roswell W. Keene,  
Joseph W. Reinhart,  
Edwin H. Shethar,  
Walter Tonnelé,

Richard S. Treacy,  
George C. Thomas,  
James F. Wenman,  
Emil Wolff,  
Maurice Untermyer,  
C. A. Coffin.  
Louis Marshall,  
Samuel Putnam,  
Horace See,  
John J. Gleason,  
Lewis Nixon,  
Henry A. Rusch,  
M. F. Westover.

The speaker of the evening, Mr. W. D. McCrackan, then read a paper entitled, *The Spirit of the East : a Trip to the Interior of Asia Minor.*

On motion, the Society adjourned.

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